JUNE 11, 1942

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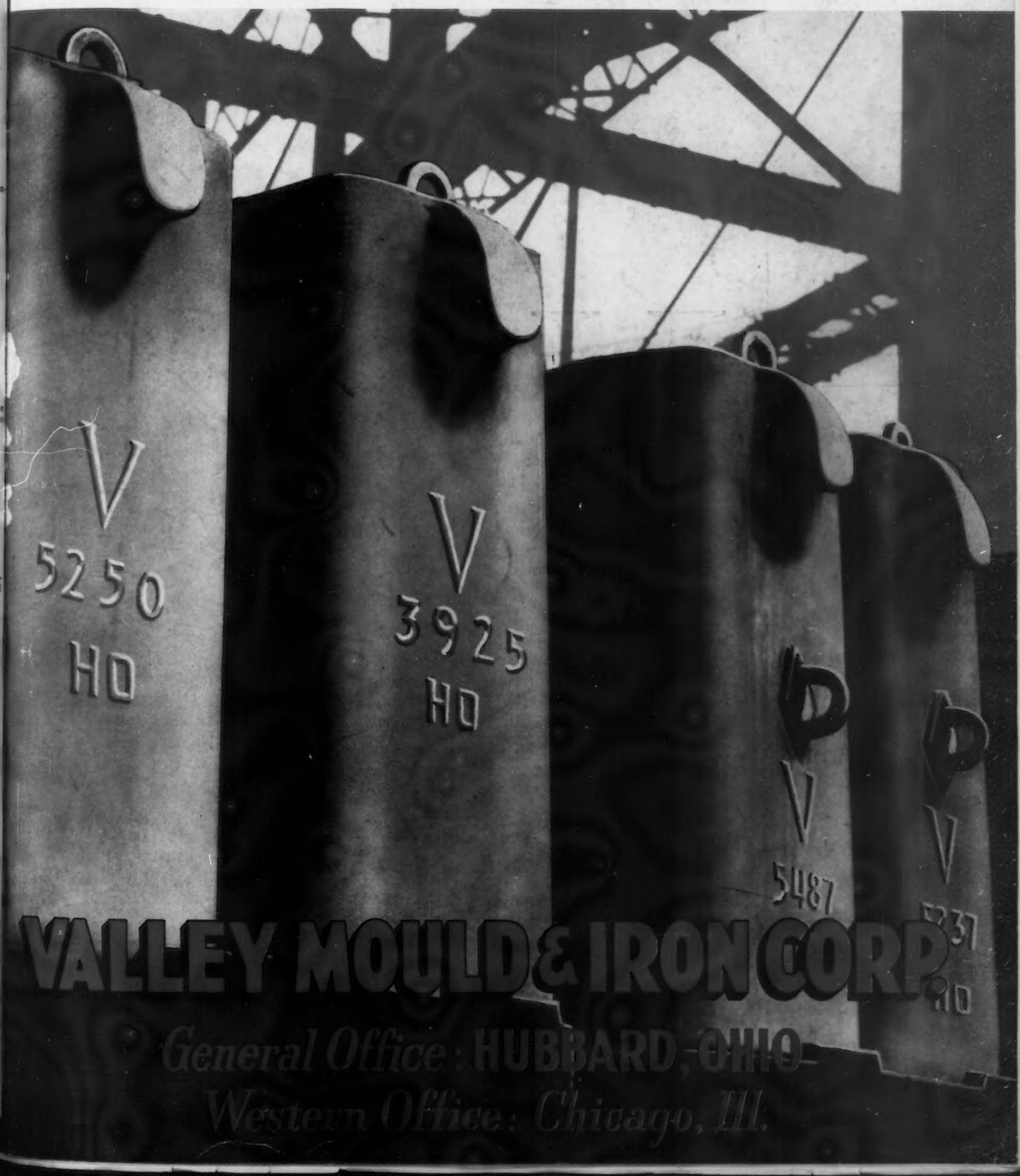
The IRON AGE



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THE IRON AGE

JUNE 11, 1942

ESTABLISHED 1855

Robbing Peter, Cheating Paul

MORE than one British infantryman was killed in Gallipoli in 1915, but without doubt the greatest loss of all was the death of Henry Moseley, the 20th century's most promising physicist, whose technical genius could have been put to more profitable use for the Allies than facing the business end of a gun.

Evidently we haven't learned much since then.

Over the past few months, three metallurgists and one expert in pyrometry have been taken from the Frankford Arsenal and put into combat service. Even key aviation designers have been drafted into the Army.

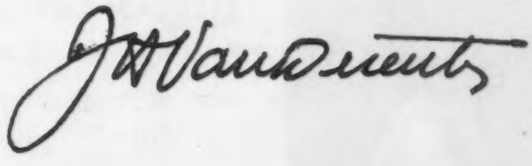
Such shortsightedness is dangerous. For the present war, even more than the last, is a battle between laboratory and laboratory, as well as a battle between soldier and soldier.

But before that fateful Sunday in December, it was pretty well recognized that our trained personnel, engineers, chemists, metallurgists, physicists, were essential to our defense effort. They were the No. 1 men who were going to make us the arsenal of the democracies. We looked to them to convert overnight our peacetime industries to defense plants; to substitute non-critical metals for those that were fast becoming scarce, and then to replace the former as they became less plentiful with plastics.

The attack on Pearl Harbor, however, changed that to a very great extent. Honest patriotism sometimes clashed with practicality. And draft boards would make no advance rulings regarding engineers and metallurgists. Some of these technical men got jittery waiting for their draft boards to determine their future, applied for their commissions and got them. This left many companies, now with war contracts, in a tight spot.

It didn't take long for the war production heads to realize the necessity for priorities and allocations of essential materials. Why not the same with essential, and too scarce, trained manpower?

We owe America and the men in our Army and Navy the very best in the implements and accessories necessary for waging modern warfare. To put into combat service men of eight to 10 years of technical training and experience is robbing industry of its ability to produce, and cheating our armed forces of the means to strike—and strike hard.



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Forming Convex Flanges and Joggles

o o o

6y WILLIAM SCHROEDER
and
ROBERT B. GLASSCO
Research Engineers, Lockheed Aircraft Corp., Burbank, Cal.

o o o

. . . This new method for producing convex flanges and joggles in sheet metal aircraft parts is carried out practically without the necessity of shrinking or distorting the material, and hence without wrinkling. It is another long step in the speeding up of aircraft construction.

o o o

IN the aircraft industry, extensive use is made of the single-acting hydraulic press equipped with a rubber-filled platen. By the action of the rubber in the platen, sometimes with the addition of rubber "blankets," sheet metal parts are caused to form over wood, metal, or composition "form blocks" shaped to desired contours.

However, in such operations the forming of convex flanges as shown in Fig. 4, requiring shrinking of the material at the outer edge of the flange, is quite a problem, since there is nothing but the rubber to support the metal against buckling under the compressive stresses. The forming of joggles is also a difficult problem. These difficulties are intensified when material of hard temper is used, such as 24ST, heat treated Alclad sheet or 1-4 hard stainless steel. In fact, it is virtually impossible to do any shrinking of 24ST Alclad with conventional form blocks in the single-acting rubber-pressure press.

However, there is a strong trend to the forming of aluminum alloy parts in the heat-treated (ST) condition to avoid the necessity of heat treating the formed parts with its attendant extra handling and distortion troubles. To meet this situation a method has been developed by Andrew Schubert and H. Adelharof at Lockheed whereby smooth convex flanges and joggles may be successfully formed from 24ST Alclad material practically without the necessity of shrinking or distorting the material, and hence without wrinkling. This method, and the principles underlying its success, have been briefly described in a recent paper* presented before the Institute of the Aeronautical Sciences. In this article, however, the method and the technique of applying it will be discussed in greater detail.

*"*Elastic Theory as a Tool in Sheet Metal Forming Problems," F. R. Shanley. Paper presented at the annual meeting of the Institue of Aeronautical Sciences, Jan. 28 to 30, 1942, p. 17.*

Convex Flanges

The basic principle used for eliminating the necessity of introducing compressive or "shrink" strains in convex flanges is to bow the web of the part to a radius equal to the contour radius of the flange, as illustrated in Fig. 1. If the flange is long it must be cut into several sections by the use of cutouts as shown in Fig. 2. To each of these sections the principle of bowing or "dishing" the web can be applied.

That this design makes feasible the forming of convex flanges without appreciably straining the flange material is demonstrated by the simple example shown in Fig. 1. In this figure it may be noted that the portion of the blank 1-2-3-4, of part (c), is almost identical in shape to the top view of the part, or web, part (d). Similarly, the remaining area of the blank 3-4-5-6 is almost identical in area and shape to the side view, part (d). Actually, the comparison of blank shape should be made with the developed surfaces of the web and flange, and if this were done the similarity between areas and shapes would be even closer. Therefore, since the finished shape and area of the developed surface of the flange and web are very nearly the same as the corresponding areas in the blank, it follows that the only forming necessary to convert the blank into the part is bending.

Applying this principle would theoretically limit the method under discussion to parts which could be formed with a cylindrical surfaced web as shown in Fig. 1. However, it has been found in practice that the part need not be bowed across the whole web, but that the bowed region near the flange may be faired into the flat web approximately as shown in Fig. 2. Changing the height of the form block

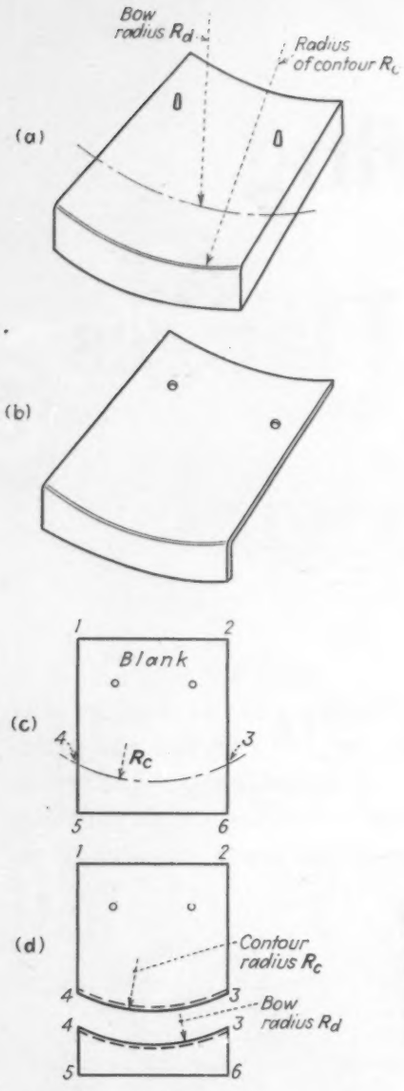

FIG. 1—Examples of forming convex flanges by bowing the web without cutouts. The design of the block is shown in part (a); design of the flange (b); the plan view of the blank in part (c); and the top and side view of the flange is shown in part (d).

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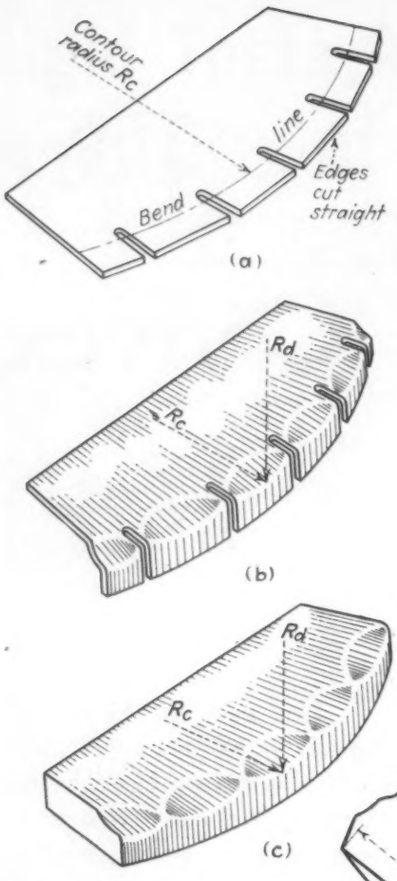


FIG. 2—Forming the convex flange with cutouts and bowing of the web. Part (a) shows a typical test blank; part (b), a typical test flange; and part (c), a typical form block.

o o o

on a slope of about 15° has been found to give satisfactory results. The resulting hollowed regions are commonly called "dishes."

Fig. 3 shows the detailed dimensions of a "dished" form block made for use on a part having several flange cutouts such as Fig. 2. The permissible vertical camber d_d in Fig. 3, part (b) is limited by the requirement that it should not encroach too much on the total flange width, W. Mating parts, clearance for rivet patterns, etc., are determining factors in this matter.

Since the radius R_d of the "dish" is taken approximately equal to the contour radius of the part, R_c, the camber d_c of the contour, as seen in the plan view in Fig. 3, part (a), will be equal to d_d, the camber of the dish. The contour of the entire curved portion of the part can then be laid out as shown in Fig. 3, part (a) and chords drawn to give the desired values of contour camber d_c. These chords then determine the locations of the cutouts. Ob-

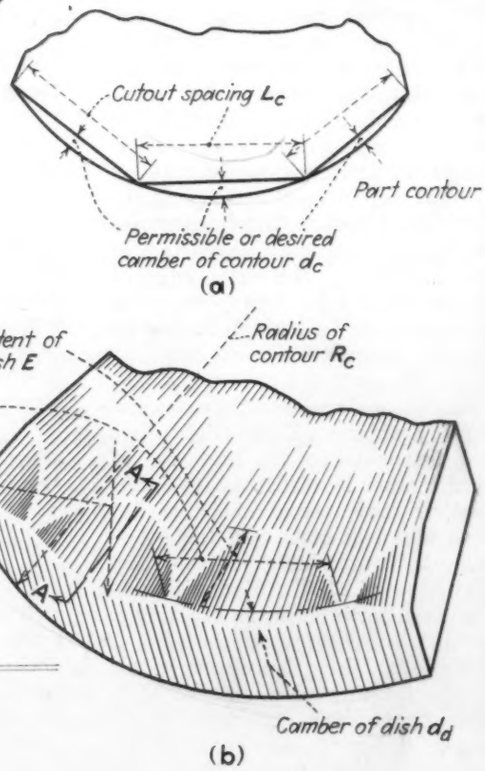


FIG. 3—Details of the form block. Part (a) is a plan view showing the contour and layout for determining cutout spacing. Part (b) is a pictorial view showing the details of the form block.

o o o

TABLE I

Experimental Form Block Specification

Material: 24ST Alclad

Gage: Both 0.025 and 0.064 in. were formed over each form block

Test No.	Contour Radius "R", In.	Camber d_c-d_d, In.	Cutout Spacing "L_c" In.	Extent of Dish "E", In.
1	6	1/16	1 3/4	3/4
2	6	1/8	2 7/16	1
3	10 1/2	1/16	2 9/32	3/4
4	10 1/2	1/8	3 7/32	1
5	33 1/2	1/16	4 3/32	3/4
6	33 1/2	1/8	5 25/32	1

Bend radius = 5/32 in.
Block angle = 100 deg.
Flange width = 3/4 in.

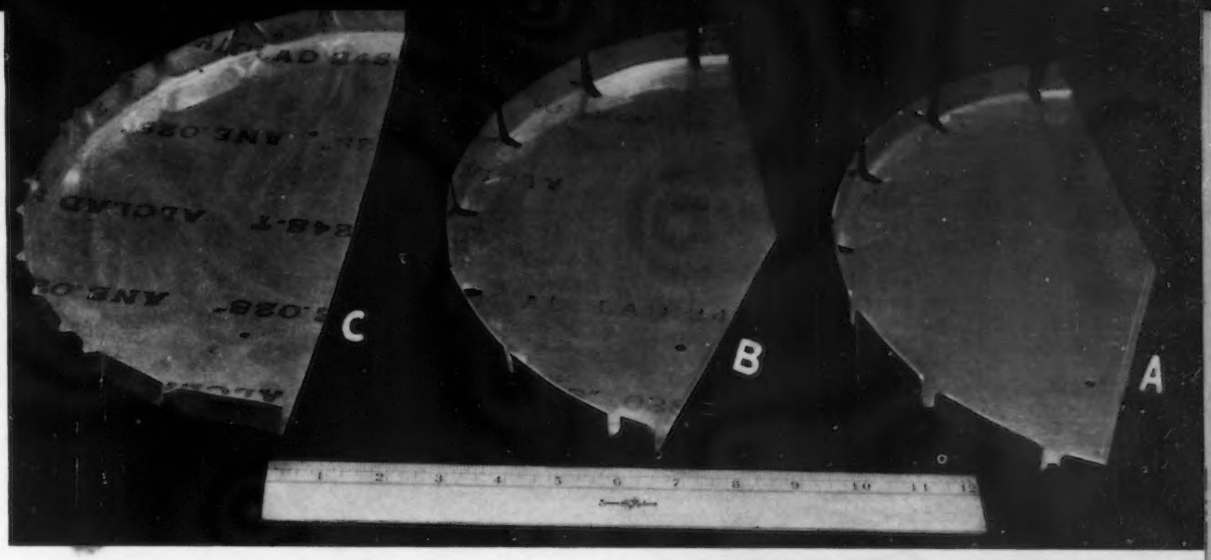


FIG. 4—Comparison of 24ST parts formed on a dished form block with those formed on a conventional form block. The contour radius is 6 in., and the camber of the dish is 1/8 in. Part (a) is 0.064 in. stock formed on a dished form block; part (b) is 0.025 in. material on a dished form block; and part (c) is 0.025 in. stock on the conventional form block.

viously if the camber is maintained constant, the cutout spacing will be uniform if the contour of the part is circular; and non-uniform if the contour of the part is non-circular. The blank is cut with straight segments between cutouts as shown in Fig. 2, part (a).

A series of 24ST test parts, similar to the one shown in Fig. 2, were made on the described principle. Form blocks were made to the specifications of Table I. For each contour radius two cambers were selected, one of 1/16 in. and the other of 1/8 in. These, in turn, gave two different cutout spacings. Care was taken to fair the dish smoothly into the flat top of the form block. Parts of 0.025 and 0.064 in. 24ST Alclad were formed over each form block.

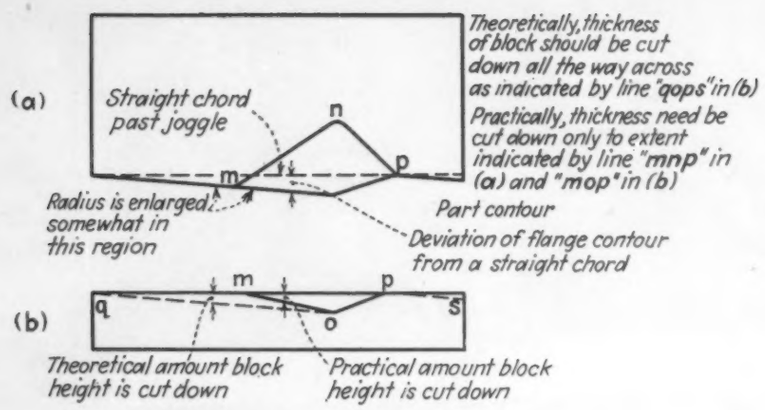
Photographs of typical results are shown in Figs. 4, 5 and 6. All

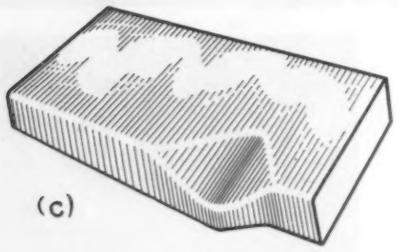
RIGHT

FIG. 5—Comparison of 24ST flanges formed on dished form block with those formed on the conventional form block. The contour radius is 10½ in., and the camber of the dish is 1/8 in. Part (a) is 0.025 in. stock formed on the conventional form block; part (b) is 0.025 in. material on a dished form block; and part (c) is 0.064 in. material formed on a dished form block.

BELOW

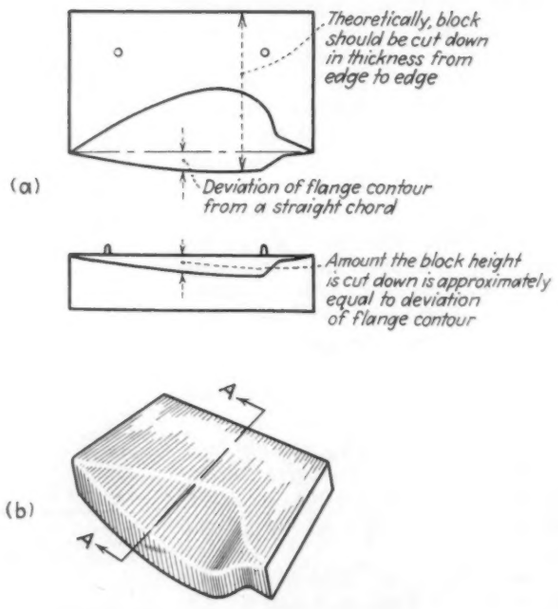
FIG. 6—Comparison of 24ST Alclad flanges formed on a dished form block with one formed on a conventional form block. The contour radius of this 24ST Alclad stock is 33½ in., and the camber of the dish is 1/8 in. Part (a) is 0.025 in. material formed on a conventional form block; part (b) is 0.025 in. material formed on a dished form block; and part (c) is 0.064 in. thick stock on a dished form block.


(a)
Straight chord past joggle
n
m
p
Theoretically, thickness of block should be cut down all the way across as indicated by line "qops" in (b)
Practically, thickness need be cut down only to extent indicated by line "mnp" in (a) and "mop" in (b)
Radius is enlarged somewhat in this region
Part contour
Deviation of flange contour from a straight chord
(b)
m
p
q
o
s
Theoretical amount block height is cut down
Practical amount block height is cut down



ABOVE

FIG. 7—The form block for an aircraft part having a joggle in a straight flange. Parts (a) and (b) show the details of the block, and part (c) is a perspective illustration of the block.

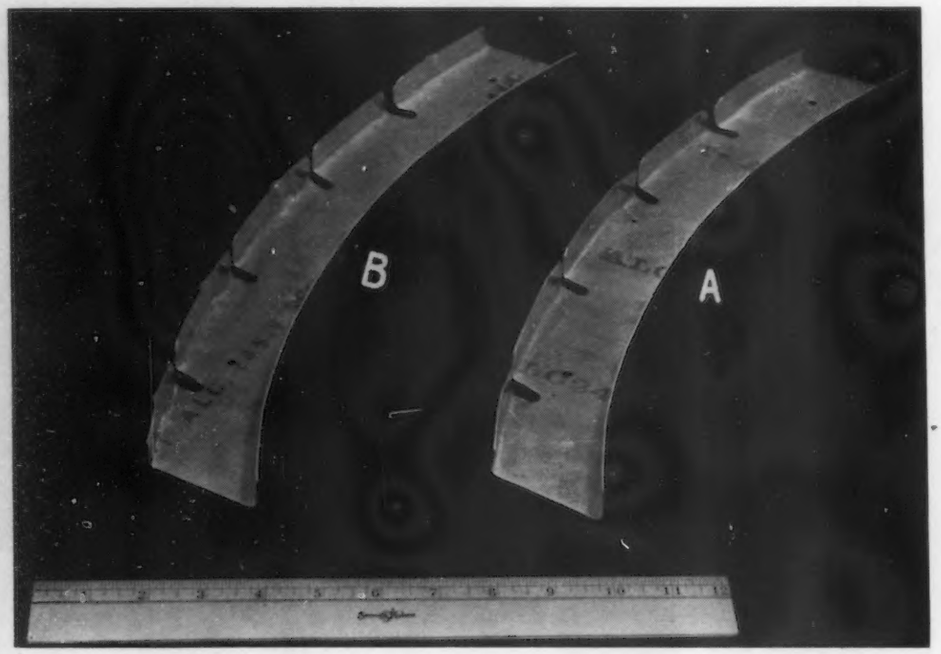

Theoretically, block should be cut down in thickness from edge to edge
(a)
Deviation of flange contour from a straight chord
Amount the block height is cut down is approximately equal to deviation of flange contour
(b)
A
A

RIGHT

FIG. 8—Form block for an aircraft part with a joggle in a convex flange. Parts (a) and (b) show in detail how the form block fits together, and part (c) is a pictorial view showing the general contours of the block.

BELOW

FIG. 9—Comparison of a 24ST Alclad convex flange with joggles formed on a dished form block with a similar part formed on the conventional form block. The stock was 0.025 in. thick, and part (a) was formed on the dished form block while part (b) was formed on the conventional form block.



of the specimens of both thicknesses formed readily without wrinkling in the flanges. Those with the large contour radii formed a smoother curve than those with the small radii. Of the two cambers used, the larger value of ⅛ in. produced parts with smoother flanges, and more desirable cutout spacings. Shop experience indicates that even greater cambers than ⅛ in. can be used to advantage wherever the design of the part permits. Slight overall bowing was observed in some of the parts, but in no case was it excessive. This bowing was probably caused by residual stresses introduced by incomplete elimination of compressive strains.

Joggles

The principle described in the preceding section may be applied to form blocks for joggles. While it is impossible at the present time to give exact dimension specifications, approximate values are indicated where possible.

Joggle in Straight Flange:

The application of the principle to a part with a joggle in a straight flange is illustrated in Fig. 7. If the principle described for convex flanges were applied explicitly to this form block, its height would be reduced all the way across to that indicated by the dotted line "qops," in Fig. 7, part (b). This reduction in height would be an

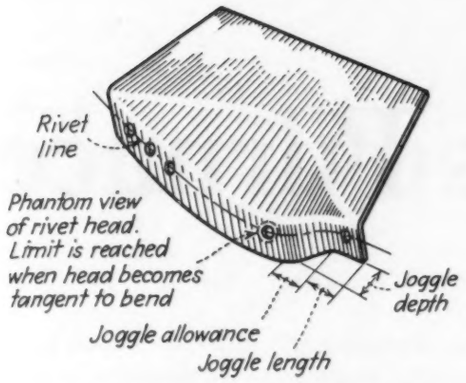
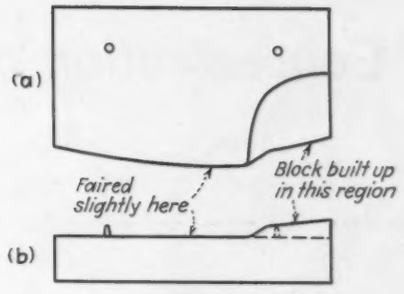

Rivet line
Phantom view of rivet head. Limit is reached when head becomes tangent to bend
Joggle depth
Joggle allowance
Joggle length

FIG. 10—A limitation of the method using the dished form block is shown here due to the interference of rivets.

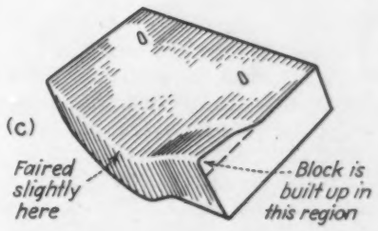
RIGHT

FIG. 11—A modified block with a convex flange and a joggle. Parts (a) and (b) show how the form blocks fit together and part (c) is a perspective view of the block.



BELOW

FIG. 12—A permissible modification of the cross-section of a form block. Part (a) is the section A-A of Fig. 8, and part (b) is a modification of cross-section A-A of Fig. 8. The distances 1-2-4 and 1-3-4 in part (b) are about equal.

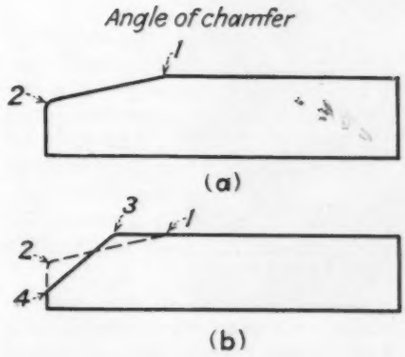


amount equal to that by which the contour in the plan view deviates from the straight chord, Fig. 7, part (a). However, in practice it has been found that good results may be obtained by fairing the dish into the top of the block in the manner shown in solid lines "mnp," Fig. 7, part (a), and by line "mop" in Fig. 7, part (b).

Joggle in Convex Flange:

Parts with joggles in convex flanges may be formed by the same principle. A typical example of this form block construction is shown in Fig. 8. Fig. 9 is a photograph comparing a typical 24ST part formed by the above principle with a part formed on a conventional form block.

It may be noted that in such parts as shown in Fig. 8, the flange becomes very narrow if the depth of joggle is appreciable. This fact sometimes makes it impractical to use this method. This happens especially due to interference of the rivet head with the bend, and the limiting condition is shown in Fig. 10. However, in such cases, a satisfactory part can be produced sometimes by the method shown in Fig. 11. Instead of dishing the form block, it may be built up in certain regions to produce an equivalent result, in that way producing a part with wider flanges. There are any number of intermediate constructions that could also be utilized if desired.



Another method for modifying the form block that has been found to possess limited usefulness is illustrated in Fig. 12. The part shown in Fig. 8 is here considered. The cross-section A-A is shown in Fig. 12, part (a), but this cross-section can usually be modified as shown in Fig. 12, part (b). The principle to follow in modifying the cross-section is to make the distance 1-3-4 nearly equal to the distance 1-2-4 as shown in Fig. 12. All other parallel cross-sections would obviously have to be modified in a similar manner.

It is believed that the shop man will be able to modify easily the technique to obtain specific results once he understands the principle of construction. Shop men acquainted with these methods state that considerable tolerance may be allowed without seriously impairing the results.

While detailed data have not been obtained, the results that have been found indicate that in general the minimum joggle allowance or "J" distance should be approximately six times the joggle depth, or six times the material thickness, whichever is the greater. These specifications were developed through experiments on thicknesses up to about 0.064 in.

It is recommended that the method of bowing or "dishing" the top of the form block be used for forming convex, or shrink, flanges, joggles, and combinations thereof, in 24ST parts, whenever this method does not produce part interference. It is further recommended that the method may also be used in many instances to facilitate forming and reduce hand work in making 24SO parts, in preference to external aids such as bearer blocks, spring loaded draw rings, or other mechanical devices.

THIRD of a series of four articles on IMPROVED AIRCRAFT FABRICATING TECHNIQUES developed by Lockheed Aircraft Corp. The two articles already published dealt with "Drawing Dies for Airframe Stampings," and "Stretch-Forming Contoured Sheet Metal Aircraft Parts." The article to appear next week will be "Hydro-Press Forming With Rubber Platens."

Concentration of Blast Furnace

By S. M. SHELTON*
and
F. D. LAMB**

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THE utilization of flue dusts produced in the smelting of iron ores is a troublesome problem to blast-furnace operators. Small particles of ore, flux and coke carried into the dust collectors by discharged gases from the furnace often amount to an appreciable percentage of the furnace feed. Losses of iron in flue dust vary within wide limits depending on a number of conditions, including characteristics of ore and fuel charge, capacity and design of furnace and rate of operation.

There are few smelters in the United States where flue dust is so low in iron that it is entirely disregarded. Usually the flue dust is recovered and returned to the smelting process in the form of sinter. Many flue dusts are comparatively low-grade, and recharging of the low-grade sinter results in dilution of the total charge. A concentration process that would yield a high-grade iron product for sintering would be desirable.

One requisite of an acceptable concentrating process would be the production of more or less uniform sintered concentrates, regardless of minor fluctuations in analysis of the flue dust. A second requirement is concentrates high enough in quality to demand a premium which would help to cover the cost of concentration. A third requirement, of course, is high recovery of the iron values in the flue dust.

Fig. 1 shows the dust-collecting system of a modern blast furnace and Fig. 2 shows a complete Dwight-Lloyd sintering plant for the sintering of flue dust.

Flue dust, as produced in a blast furnace, is essentially the result of a gas classification process. In order to be carried out of the furnace, the particles must be fine, porous or of low specific gravity. The sample investigated was typical in that the iron-bearing portion was heavy and in fine particles, while the coarser portion was composed mainly of light and porous material.

The sample had the following partial analysis: 48.4 per cent iron, 0.2 per cent manganese, 13.6 per cent silica, 2.2 per cent lime, 0.13 per cent phosphorus, 0.24 per cent sulphur and 12.6 per cent ignition loss. A screen analysis of the sample, recorded in Table 1, shows 86.3 per cent of the iron to be finer than 48-mesh.

Coarse portions of the sample, while representing considerable bulk, were porous and contained only a minor amount of the iron. Fig. 3 shows typical grains of minus 14, plus 20-mesh flue dust. Particles of coke, hematite, and silica can be distinguished; magnetite and metallic iron particles being heavier, are present only in the finer sizes. In Fig. 4, minus 100 to plus 200-mesh flue dust is shown magnified 76 times. The coke content of this size is small compared to that of the coarser sizes. Hollow, metallic iron globules are more prevalent in the fine sizes and are easily distinguished by their spherical shape.

Concentration Methods

Methods of concentration investigated included magnetic separation, gravity concentration, and flotation. The flue dust proved amenable to concentration by all three methods, but to different degrees.

Magnetic separation tests were made in a laboratory Davis † tube magnetic separator, the results of which closely approach those that may be expected of a magnetic log washer or a Crockett type, wet magnetic separator. A Davis tube magnetic separator is shown in Fig. 5.

Results of tests on samples of the flue dust as received, and after

†*"Magnetic Concentration of Iron Ore," E. W. Davis, Bulletin No. 9, University of Minnesota, 1941, p. 56.*

TABLE I
Screen Sizing Test

Size, Mesh	Weight, Per Cent	Assay, Per Cent					Per Cent of Total				
		Fe	SiO_2	CaO	P	S	Fe	SiO_2	CaO	P	S
+ 10	0.53	24.6	6.5	2.5	0.08	0.90	0.3	0.3	0.5	0.3	1.3
− 10 + 14	0.61	32.5	6.5	1.6	0.12	1.20	0.4	0.3	0.4	0.5	2.0
− 14 + 20	1.31	36.0	6.3	2.4	0.11	0.93	0.9	0.7	1.2	1.0	3.3
− 20 + 28	2.12	37.4	7.3	3.1	0.13	0.41	1.6	1.2	2.5	2.0	2.4
− 28 + 35	4.17	44.2	6.2	2.4	0.11	0.30	3.8	2.0	3.8	3.3	3.4
− 35 + 48	7.28	45.0	8.3	2.2	0.17	0.37	6.7	4.8	6.2	8.8	14.9
− 48 + 65	11.62	46.8	9.7	2.2	0.17	0.33	11.0	8.9	9.8	14.0	10.4
− 65 + 100	15.42	50.1	9.2	2.2	0.12	0.28	15.6	11.2	12.8	13.2	11.8
− 100 + 150	19.18	50.3	14.7	2.1	0.11	0.28	19.5	22.3	15.5	15.0	22.5
− 150 + 200	22.34	52.8	14.0	3.8	0.16	0.28	23.8	24.7	32.2	25.4	17.1
− 200	15.42	52.8	19.4	2.6	0.15	0.26	16.4	23.6	15.1	16.5	10.9
Composite	100.00	49.4	12.7	2.6	0.14	0.30	100.0	100.0	100.0	100.0	100.0
Heads	.....	48.4	13.6	2.2	0.13	0.26	.....	.....	.....	.....	.....

*Supervising Engineer, Ore Dressing Section, Metallurgical Division, Bureau of Mines, Rolla, Mont.
**Associate Metallurgist, Ore Dressing Section, Metallurgical Division, Bureau of Mines, Rolla, Mont.

Flue Dusts

. . . Three methods for the concentration of blast furnace flue dusts are described, by permission of the Director of the Bureau of Mines, U. S. Department of the Interior, along with sample preparation and the results of tests.

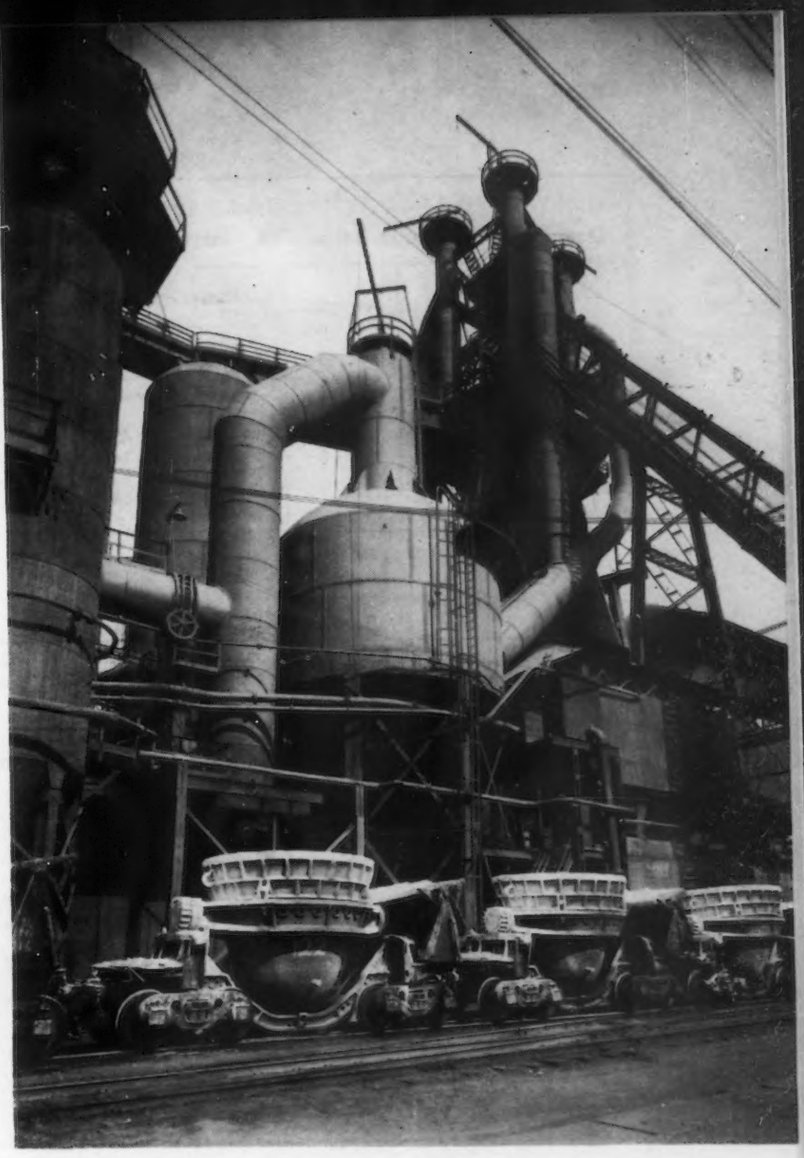


FIG. 1 — The dust collecting system of a modern blast furnace.

grinding to minus 100-mesh, are shown in Table II. A recovery of 65.8 per cent of the iron was obtained in concentrates assaying 65.5 per cent iron on the unground sample. Grinding to minus 100-mesh before separation yielded concentrates that assayed 67.7 per cent iron, representing a recovery of 60.5 per cent of the total iron of the sample.

The results are similar to those obtained on Birmingham district flue dusts.†† Higher grade concentrates can be made by grinding the flue dust to minus 100-mesh before concentration, but better recoveries may be expected from the unground material.

Much of the iron, especially in the coarser sizes, is in the form of hematite which, because of its low magnetic susceptibility, would not be recovered in a separator of the Davis tube type. A sample was roasted in a reducing atmosphere of hydrogen at 1022 deg. F. for 30 min. to convert the hematite to magnetite. The roasted sample was then treated in the Davis tube separator with the results shown in Table III. A recovery of 95.8 per cent of the iron was obtained in the magnetic concentrates that assayed 65.9 per cent iron.

A roasting step, separate from the blast furnace operation, could be operated to make the iron uniformly magnetic and produce a uniform product regardless of the reactions taking place in the blast furnaces. However, the gases in the shaft of a blast furnace are necessarily reducing in character and it is possible that most of the iron in the flue dust discharged from the furnaces is magnetic but becomes reoxidized on discharge from the dust catcher.

If provisions were made to cool the flue dust in a reducing atmosphere, a high recovery of iron

††*"Magnetic Concentration of Flue Dust of the Birmingham District." Oscar Lee, B. W. Gandrud, and F. D. DeVaney. U. S. Bureau of Mines, Report of Investigations, 2761, July, 1926.*

TABLE II

Davis Tube Magnetic Separation Tests on Unroasted Flue Dust

Size, Mesh	Product	Weight, Per Cent	Assay Per Cent		Per Cent of Total	
			Fe	SiO_2	Fe	SiO_2
As received	Magnetic portion	49.2	65.5	4.7	65.8	15.5
	Non-magnetic portion	50.8	32.9	24.8	34.2	84.5
	Composite	100.0	48.9	14.9	100.0	100.0
	Heads	.....	48.4	13.6	.....	.....
Minus 100-mesh	Magnetic portion	42.4	67.7	3.4	60.5	9.7
	Non-magnetic portion	57.6	32.5	23.4	39.5	90.3
	Composite	100.0	47.4	14.9	100.0	100.0
	Heads	.....	48.4	13.6	.....	.....

TABLE III
Davis Tube Magnetic Separation Test on Roasted, Unground Flue Dust

Product	Weight, Per Cent	Assay, Per Cent		Per Cent of Total	
		Fe	SiO_2	Fe	SiO_2
Magnetic portion	71.8	65.9	4.0	95.8	19.6
Non-magnetic portion	28.2	7.3	41.7	4.2	80.4
Composition	100.0	49.4	14.6	100.0	100.0
Roasted heads	.....	48.9	14.4	.....	.....
Unroasted heads	.....	48.4	13.6	.....	.....

TABLE IV
Effect of Sintering

Product	Assay, Per Cent						
	Fe	Mn	SiO_2	CaO	P	S	Ignition Loss
Unroasted heads	48.4	0.2	13.6	2.2	0.13	0.24	12.6
Unroasted heads after sintering	55.2	0.4	14.0	2.2	0.09	0.02	2.7
Magnetic product from roasted heads	65.9	0.6	4.0	1.9	0.12	0.15	5.2
Magnetic product from roasted heads after sintering	65.2	0.6	5.1	1.9	0.10	0.01	2.1

TABLE V
Wilfley Table Test of Unclassified Flue Dust

Product	Weight, Per Cent	Assay, Per Cent Fe	Per Cent of Total Fe
Concentrates	60.6	60.0	79.6
Tailings	36.7	23.3	18.7
Plus 20-mesh coke	2.7	29.7	1.7
Composite	100.0	45.7	100.0
Heads	.....	48.4	.....

TABLE VI
Wilfley Table Test of Flue Dust After Crushing to Minus 65-Mesh

Product	Weight, Per Cent	Assay, Per Cent Fe	Per Cent of Total Fe
Concentrates	28.4	67.4	38.8
Middlings	7.2	38.7	5.7
Tailings	10.7	8.7	1.9
Minus 150-mesh fines	53.7	49.3	53.6
Composite	100.0	49.3	100.0
Heads	.....	48.4	.....

might be obtained by magnetic separation without a roasting treatment provided hematite particles were reduced to magnetite in passing through the blast furnace. Results of sintering an unroasted sample and a sample of the magnetic product obtained from a roasted sample are shown in Table IV.

Sintering the unroasted sample raised the grade from 48.4 per cent to 55.2 per cent iron with a slight increase in silica. Sintering the magnetic concentrates from the roasted heads had little effect on the iron content. Before sintering, the magnetic product assayed 65.9 per cent iron as shown in Table III, and assayed 65.2 per cent iron after sintering. A suggested flow sheet employing magnetic concentration is shown in Fig. 6.

Gravity Concentration

A series of table tests was run to determine the amenability of the flue dust to gravity concentration. A typical test, recorded in Table V, was made on a sample without grinding or classification. The plus 20-mesh size was screened out before tabling because it is mainly coke. A recovery of 79.6 per cent of the iron was obtained in concentrates assaying 60.0 per cent iron. No middlings product was made.

A test was made in which a sample was ground dry to minus 65-mesh and the minus 150-mesh slimes removed before tabling. Results are shown in Table VI. Concentrates assaying 67.4 per cent iron were obtained representing a recovery of 38.8 per cent of the total iron. Iron contained in the minus 150-mesh slimes portion of the sample represented 53.6 per cent of the total iron. Combining the slimes with the concentrates resulted in a recovery of 92.4 per cent in a product assaying 55.6 per cent iron.

Results of a third table test in which the sample was separated on a 20-mesh screen and the minus 20-mesh material classified in a constriction plate classifier before tabling are shown in Table VII. The fine overflow of the classifier was classed as slimes and not tabled. After the sample was partly deslimed, a strong upward current of water was allowed to remove a light coarse product composed

mainly of coke. The coke product was tabled to produce concentrates No. 1, middlings and tailings No. 1.

The material remaining in the classifier after removal of slimes and the coke was divided into two sizes. The finer size was tabled to produce concentrates No. 2, middlings, and tailings No. 2. The coarse size was tabled to produce concentrates No. 3, and middlings. The middlings products were combined and retabled to make concentrates No. 4 and final middlings.

The combined concentrates assayed 65.7 per cent iron and accounted for 66.7 per cent of the total iron. Combining the concentrates and middlings gave a recovery of 92.0 per cent of the iron in a product assaying 59.2 per cent iron.

Flotation

Recent advances in flotation, especially in the use of cationic re-

TABLE VII
Wilfley Table Test of Classified Flue Dust

Product	Weight, Per Cent	Assay, Per Cent Fe	Per Cent of Total Fe
Concentrates No. 1	3.0	64.6	3.9
Concentrates No. 2	11.4	67.0	15.5
Concentrates No. 3	16.1	69.0	22.5
Concentrates No. 4	19.6	62.3	24.8
Combined concentrates	50.1	65.7	66.7
Middlings	26.6	46.9	25.3
Combined concentrates and middlings	76.7	59.2	92.0
Tailings No. 1	8.7	12.8	2.3
Tailings No. 2	9.5	13.4	2.6
Plus 20-mesh coke	2.8	29.7	1.7
Classifier slimes	2.3	30.3	1.4
Combined tailings residue	23.3	16.8	8.0
Composite	100.0	49.3	100.0
Heads	.....	48.4	.....

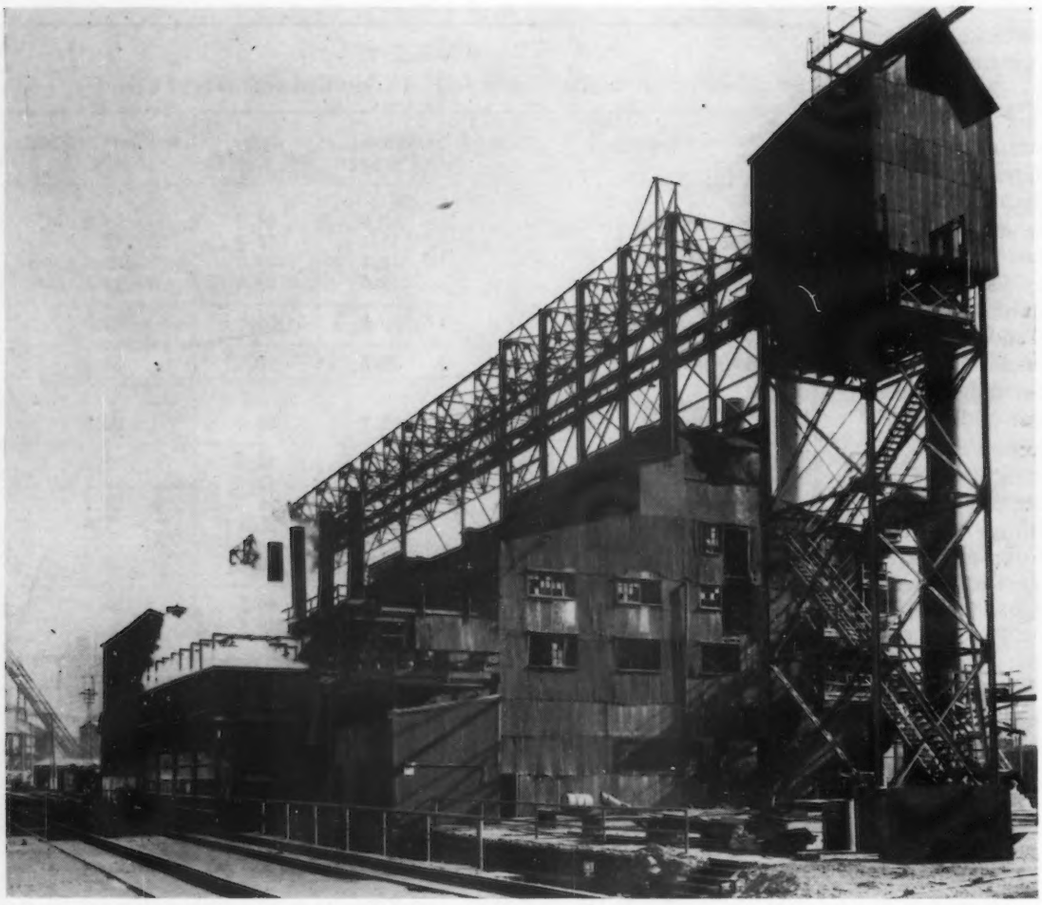
TABLE VIII
Cationic Flotation Test of Minus 100-Mesh Flue Dust

Product	Weight, Per Cent	Assay, Per Cent Fe	Per Cent of Total Fe	Reagent	Lb. Per Ton of Flue Dust		
					Conditioner	Concentrates No. 1	Concentrates No. 2
Fe product (tailings)	81.6	56.3	92.3	Kerosene	0.25	.....	.....
Concentrates No. 1	13.4	12.7	3.4	Pine oil	0.25	.....	.....
Concentrates No. 2	5.0	37.6	3.8	Alpha P	.....	.....	1.00
				Sulphuric acid	.....	.....	1.75
Composite	100.0	49.5	100.0	Time, min.	5	2	10
Heads	.....	48.4	.....				

TABLE IX
Flotation Test With Oleic Acid as Collector

Product	Weight, Per Cent	Assay, Per Cent Fe	Per Cent of Total Fe	Reagents	Lb. Per Ton of Flue Dust			
					Conditioner	Concentrates No. 1	Conditioner	Concentrates No. 2
Fe product (tailings)	82.6	55.0	91.5	Kerosene and pine oil	0.25	.....	.....	.....
Concentrates No. 1	9.1	11.8	2.2	Sodium hydroxide	.....	.....	0.75	.....
Concentrates No. 2	8.3	37.8	6.3	Sodium silicate	.....	.....	0.50	.....
				Oleic acid and emulsol X-1*	.....	.....	1.00	.....
Composite	100.0	49.6	100.0	Time, min.	5	2	2	10
Heads	.....	48.4	.....					

* An emulsion of equal parts of oleic acid and emulsol X-1 reagents.

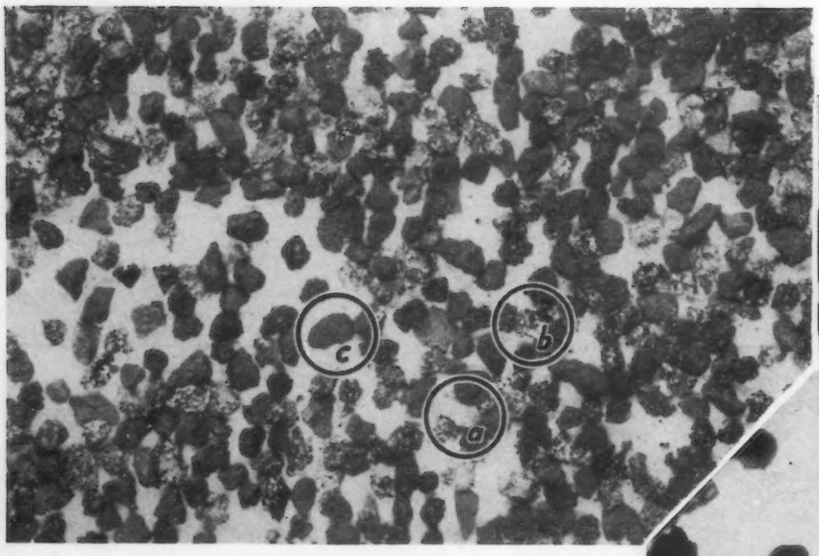


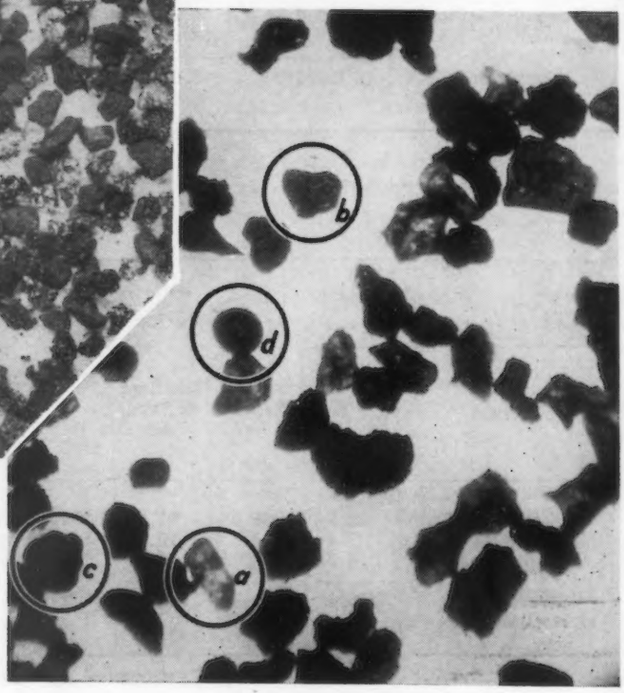
LEFT

FIG. 2 — A Dwight - Lloyd sintering plant for sintering flue dust from the blast furnace.

BELOW

FIG. 4—Blast furnace flue dust, enlarged 76 times, minus 100 plus 200-mesh size. Shown are: (a) Silica, (b) coke, (c) magnetite and, (d) iron.





ABOVE

FIG. 3—Blast furnace flue dust, minus 14 plus 20-mesh size, enlarged four diameters. In the photo are shown: (a) Silica, (b) coke and, (c) hematite.

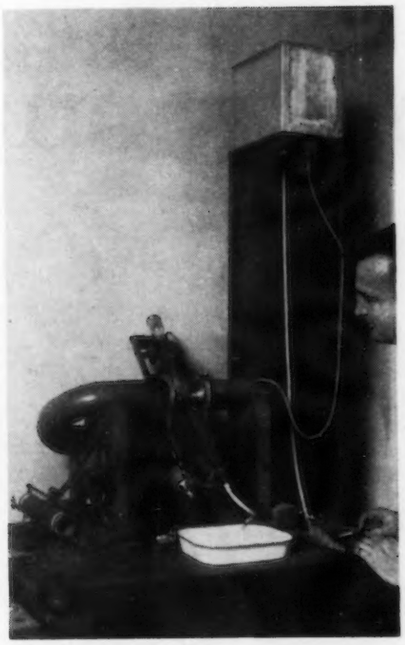


FIG. 5—This is the Davis tube magnetic separator used in concentrating the flue dusts. Courtesy of Bureau of Mines, U. S. Department of Interior.

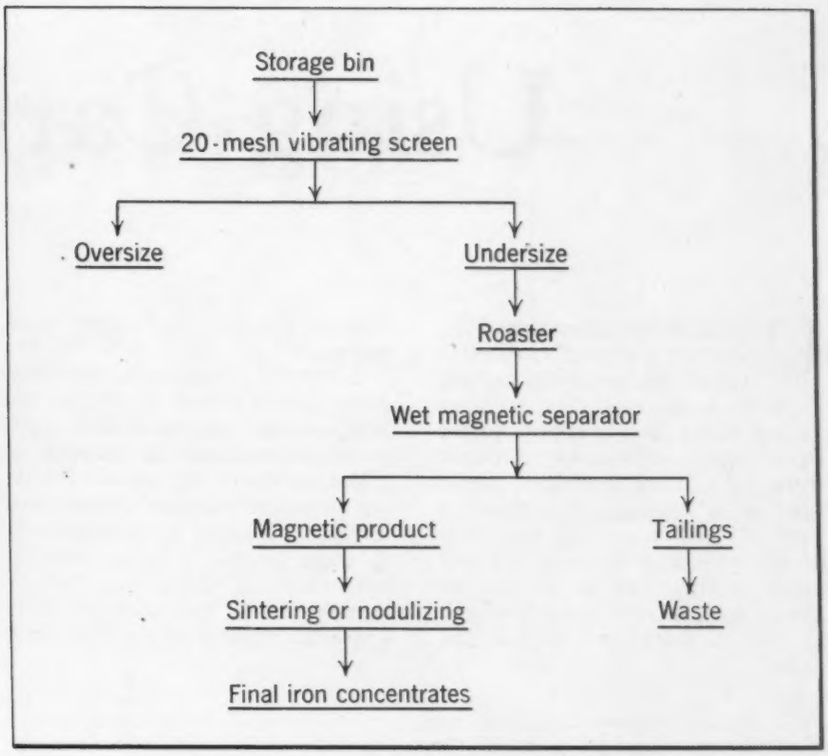


FIG. 6—A flow sheet for magnetic concentration of blast furnace flue dusts.

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agents for the flotation of silica suggest that flue dusts, rich in iron and relatively low in silica, might be beneficiated. Tests employing various cationic reagents as collectors were promising but in no test was the grade of the iron product raised above 57 per cent. Results of a typical test in which the ore was ground in a pebble mill with zeolite-treated water and floated in a laboratory mechanically agitated flotation machine are shown in Table VIII.

The concentrates from the first flotation period were composed mainly of coke. Concentrates from the second period comprised 5 per cent of the total weight and assayed 37.6 per cent iron. Recovery in the flotation residues amounted to 92.8 per cent of the total iron in a product assaying 56.3 per cent iron.

Cationic reagents apparently had little tendency to float the iron oxides. Much of the silica in the flue dust was stained or coated with iron oxide which depressed the silica particles.

Flotation tests employing oleic acid as collector gave very similar results, the coke being easily floated while the iron and iron-stained silica remained depressed. Results of a typical test are shown in Table IX.

Magnetic concentration of flue dust to a grade high enough to demand a premium above ordinary iron ores is possible. Tests on the unroasted flue dust yielded concentrates assaying 65.5 per cent iron with a recovery of 65.8 per cent of the total iron. After a reducing roast, magnetic concentrates were made assaying 65.9 per cent iron, representing an iron recovery of 95.8 per cent.

Gravity concentration tests were not as successful as magnetic separation tests because of the extremely fine particle size of a large portion of the iron in the flue dust. Tabling the unground flue dust resulted in a recovery of 79.6 per cent of the iron in concentrates assaying 60.0 per cent iron. After grinding the sample to minus 65-mesh and removing the minus 150-mesh portion before tabling, concentrates were obtained assaying 67.4 per cent iron, representing 38.8 per cent of the total iron. Combining the table concentrates with the minus 150-mesh portion of the ore resulted in a recovery of 92.4 per cent of the iron in a product assaying 55.6 per cent iron. Tabling the sample, after classification to remove fines and coke, resulted in concentrates assaying 59.2 per cent iron representing 92.0 per cent of the total iron.

Flotation tests employing cationic and anionic reagents were not sufficiently successful to warrant the use of the process as a means of beneficiating the flue dust. Concentrates assaying 56.3 per cent iron were obtained by flotation of the coke as a means of concentrating the iron. Recovery amounted to 92.8 per cent of the total iron.

Acknowledgments

Acknowledgment is made to Jones & Laughlin Steel Corp., Pittsburgh, who furnished the flue dust samples, and to S. P. Kinney of H. A. Brassert and Co., Pittsburgh, who suggested the investigations.

Using Carbides on

UNTIL recently there was little interest among manufacturers in applying carbide tools to large machines such as boring mills, large vertical turret lathes, engine lathes, etc. Not only were such large machines rarely run on a continuous basis, but most of these machines were also of old types and designed for low speed cutting (25 to 30 ft. per min.), were insufficiently powered to use carbides, and lacked the rigidity required for higher-speed operation.

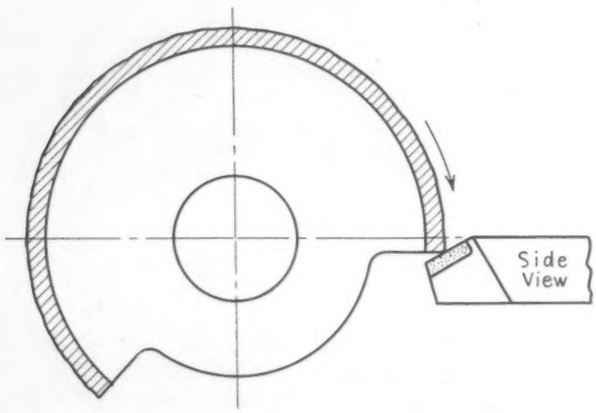
Today the situation is different. Many a large machine is on the "critical" list. Production on such machines has had to be stepped up under pressure. It is not surprising therefore that there is a sharp increase in usage of carbide tools on large machines today, particularly those of the newer designs brought in by the war program. These later machines are built with greater rigidity and for higher cutting speeds than their prototypes and are usually higher powered.

Among the factors which have contributed to broadening the use of carbide tools on large work and large machines generally are:

(1) Increased knowledge of proper speeds and feeds as well as improved clamping fixtures, rigid tool holders, etc.

(2) Better determination of shank and tip sizes required for handling heavy cuts.

(3) Increased knowledge of tool shape and cutting angles. For example, the development of negative back rake angle tools has contributed greatly. In some instances these negative back rakes have been carried to an extreme degree to obtain a shear type of cut, as in Figs. 1 and 2. The latter have made important contributions to the ability of carbide tools to handle interrupted cuts on large work. The tools are so designed that the



ABOVE

FIG. 1—Sketch illustrating the "shear" cut obtained with the newer negative rake Carboloy tools now widely used on machining large work with interrupted cuts. Note that impact load is decreased and is not concentrated on point of tool.

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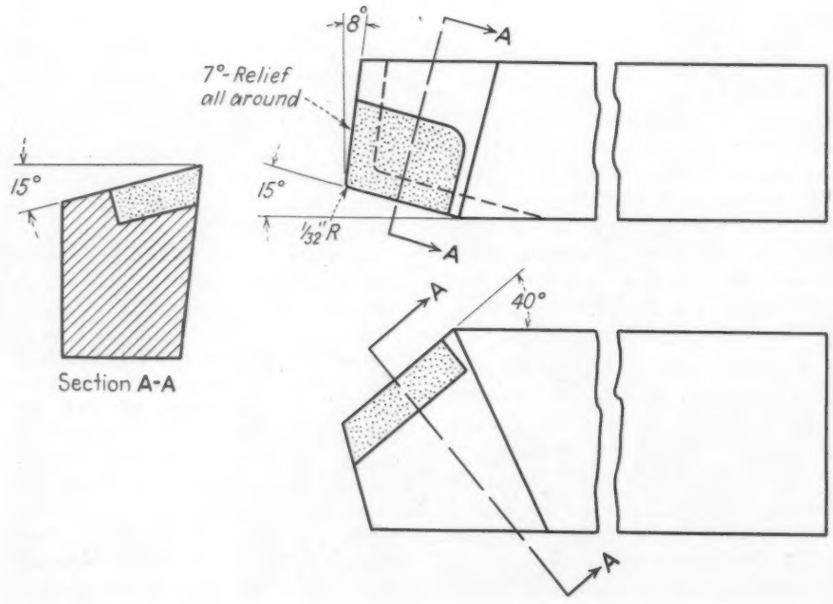
RIGHT

FIG. 2—Carboloy tool with extreme negative rake used to obtain a "shear" cut. This tool is best suited to roughing cuts on large diameters. It is not recommended for most finish cuts because the chip curls toward the work and spoils the finish.



Large Machines

By FRED W. LUCHT
Engineer, Carboloy Co., Inc.

impact following an interruption is minimized by gradual entry of the tool into the cut, since with a negative back rake the initial load is taken back away from the nose of the tool.

(4) The general adoption of centralized grinding rooms for reconditioning single point tools as well as reamers, drills and other end-cutting tools. The centralized grinding room assures proper grinding of the carbide tools by trained grinder hands and at the same time saves the machine operator from taking time out to grind his own cutting tools.

Another factor responsible for the increased usage of carbide tools on large machines is the ability, today, of shops to produce carbide tools by tipping their own shanks. Shanks must be large enough to take care of the tool overhang which is frequently of considerable magnitude on large boring mills. Charts are available for selecting correct shank and tip proportions.

Advantages of the use of carbide tools on large machines may be summarized as follows:

(1) Increase of cutting speed permits a reduction in feed, insuring better finish, without reduction in metal removal. Since higher cutting speeds go hand in hand with maximum efficiency and output, the machines should be capable of running at speeds about two to four times those normally used with H.S.S.

(2) Use of lighter feeds permits use of lighter fixtures, of simpler design and lower cost. (Best results are obtained when the feed is held below 0.030 in.)

(3) With lighter feeds, lighter, thin-wall parts can also be machined more effectively and quicker. Parts do not have to be chucked or fastened as securely—avoiding distortion.

(4) Carbide tools usually provide longer tool life per grind, reducing down-time, set-up time, etc.

(5) Carbide tools permit the ready machining of harder materials, such as armor plate castings and forgings and heat treated alloy steels of 300 to 500 Brinell hardness.

(6) Operators turn out more work with less effort. Do not have to replace and grind tools so often, nor check as often for changing dimensions due to tool wear.

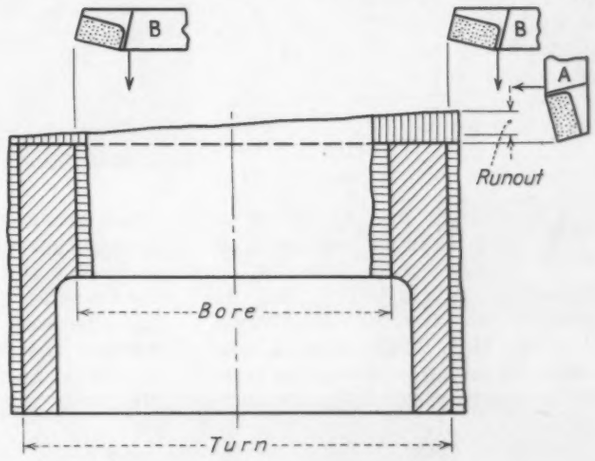


FIG. 3 — Tool *A* takes facing cut removing scale and runout on back of casting. Tools *B* then take turning and boring cuts. This practice enables tools *B* to hold size better throughout entire length of cut since they start in clean metal.

In putting carbide tools to work on large machines it has frequently been found that the advantages gained far exceeded the results attributable to carbide tools alone. The introduction of a new element, such as carbide tools, has permitted reorganizing of traditional machining practice in a manner which would have been difficult to accomplish otherwise.

Prime among shop practice improvements along this line have been the following:

(1) "Planned" cutting

(2) Adoption of tool setting devices for quicker set-up

(3) Greater usage of machine dials as a check on cutting.

Planned cutting means nothing more than changing the order of cuts in order to remove stock in the fastest way. It is surprising how little attention is given this question in some plants—such as the rough facing of a part before turning to reduce the excessive run-out of the work, Fig. 3. This practice may not only reduce the travel of both the turning and boring tools but will also enable them to start the cuts in clean metal instead of scale, allowing these tools to hold size better and tending to reduce the frequency of tool changes. In some applications it has been found possible by planned cutting (plus carbide tools) to reduce machining time by many hours.

Adoption of some form of tool setting devices for quicker set-up is another factor that can contribute materially to greatly increased output. It's not a bad idea to adopt a get-rid-of-calipers slogan. Indicators, simple tool setting gages as part of the fixture, and the use of machine dials may be used to speed tool set-up. Checking the machine dial setting when changing tools provides a surprisingly accurate method of speeding tool setting.

On some jobs, where chip interference does not prevent, another useful trick to speed tool setting is permanently to clamp an indicator on the cross-slide.

Precision Pipe Bending

. . . A new pipe bending process developed by Britain's Blackburn Aircraft, Ltd., reduces production time, permits use of less skilled workmen, and produces highly satisfactory bent pipe for aircraft applications.

AN entirely new technique in pipe bending methods, introduced and developed by Blackburn Aircraft, Ltd., and described in *Aircraft Production*, London, May, 1942, gives a considerable saving in production time, while a much greater degree of precision and interchangeability in the finished parts is obtained without the use of skilled craftsmanship. Complicated forms with bends in several planes may readily be produced as accurately as simple bends. This method of pipe bending has been made available to the aircraft industry by Blackburn and has been adopted by a number of British manufacturers.

Until the new process was evolved, the many pipes required for modern aircraft were hand formed by skilled coppersmiths. Even with experienced workers, the process was relatively slow, and the finished work was not entirely uniform. With the Blackburn process, pipes are bent entirely by machine, with a high degree of precision, and the work does not require highly skilled operators. The process has been developed to a point where all pipes in production quantities can be so handled, and only experimental "one-off" pipes or small batches are hand formed. On most pieces the time saved is marked, pipes formerly requiring several hours to bend by hand now being produced in a few minutes. In addition to aircraft work the process is suitable for automobile, light marine, and general engineering pipe work wherever quantities warrant the relatively inexpensive equipment needed.

Aircraft Pipe Bending

Pipes for oil systems, hydraulic lines, and gun turrets in Tungum, Baronia metal, aluminum alloy, copper and brass may all be machine-formed successfully, copper responding better than the other materials. Steel pipes also may be handled successfully, the tools required being arranged to suit any special material.

As an example of the use of the process, it may be stated that the Blackburn Botha twin-engined bomber is entirely equipped by press-formed pipes ranging from ½ to 1½ in. o.d. by 24 and 22 standard wall gage, and tungum, duralumin, and pipe in aluminum from ½ to 1¾ in. by 20 and 16 standard wall gage.

Bends may be simple and confined to one plane, or may be formed in several planes. The length of the pipe is not limited to the size of machine in use as the pipe can be allowed to overhang.

Bending Presses

Bending is performed by special dies constructed mainly of wood, and these are used in a suitable press, hydraulic, pneumatic, or mechanically operated. Blackburn Aircraft uses a vertical screw press (shown in Fig. 1) with friction drives of their own design, driven by an electric motor of 0.5 hp. The effective stroke is 18 in. and, as a slow even pressure is required when producing the bends, this type of press is particularly suitable. A rate of feed of 10 in. per min. is used, the return stroke being speeded up to 14 in. per min. A faster return motion might be used to advantage if available. The baseplate of the press is 2 ft. wide by 4½ ft. long, but this is not the limit of size of the dies which may be used, as they may overhang the baseplate on either side.

A pneumatic type of press, designed especially for the Blackburn process, is operated from the compressed air supply mains, the movement of the ram being controlled by trip gear actuating the air slide valve. The speed of the ram can be adjusted separately for the up and down strokes.

Bends are made in the press in dies or jigs of several types. For all general work the press tools are wood and comprise punch and die arranged to slide vertically together. Birch is commonly used in the construction of the tools, the wood being suitably reinforced at points of high stress by metal plates, and faced by surfaces of red fiber or "Tufnol" (carp grade) where subjected to heavy local pressure or wear. The two portions of the jig or die have suitable registers or grooves to keep them in correct relation during the working stroke, and clamps or fixtures receive and locate the pipe. A liberal coating of grease is applied to contact surfaces of the jig and pipe

being bent to assist the operation, and the pipes are filled or loaded before bending to prevent collapse or local puckering of the walls.

Where the bends are of an easy character and all in one plane, a simple tool consisting of a top and bottom die is all that is necessary. The two dies are cut to the form to be generated, and a stroke of the press completes the bending operation. Press bending of this type has, of course, been practiced for some years. Most jobs, however, require bends in two planes, necessitating dies constructed to form the bends by combined downward thrust and wedging action normal to the press stroke.

Fig. 1 shows the press and the tools for producing a pipe with fairly simple bends in two planes. A close-up view of the tools at the start of the stroke is given in Fig. 2. The pipe shown received a first slight set by hand, and is held down by clamp buttons. The two spiral form dies are about to descend and force the ends of the pipe into the required shape. As the press ram descends, the pipe is gradually bent around the former blocks of the fixture by the helical faces of the tools, which mate in helical slots cut in the lower die.

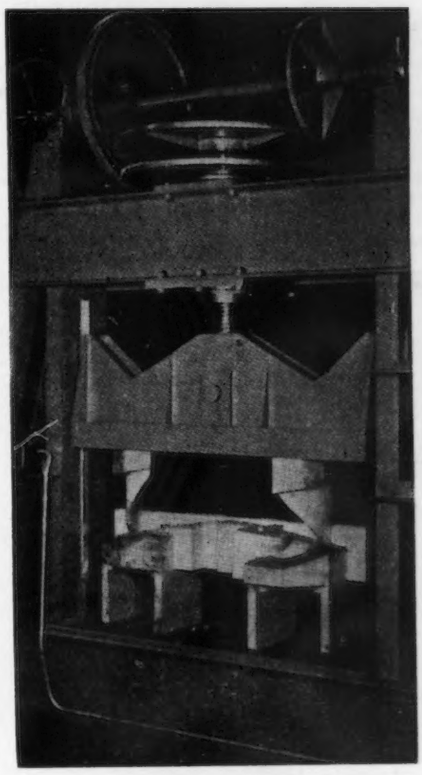


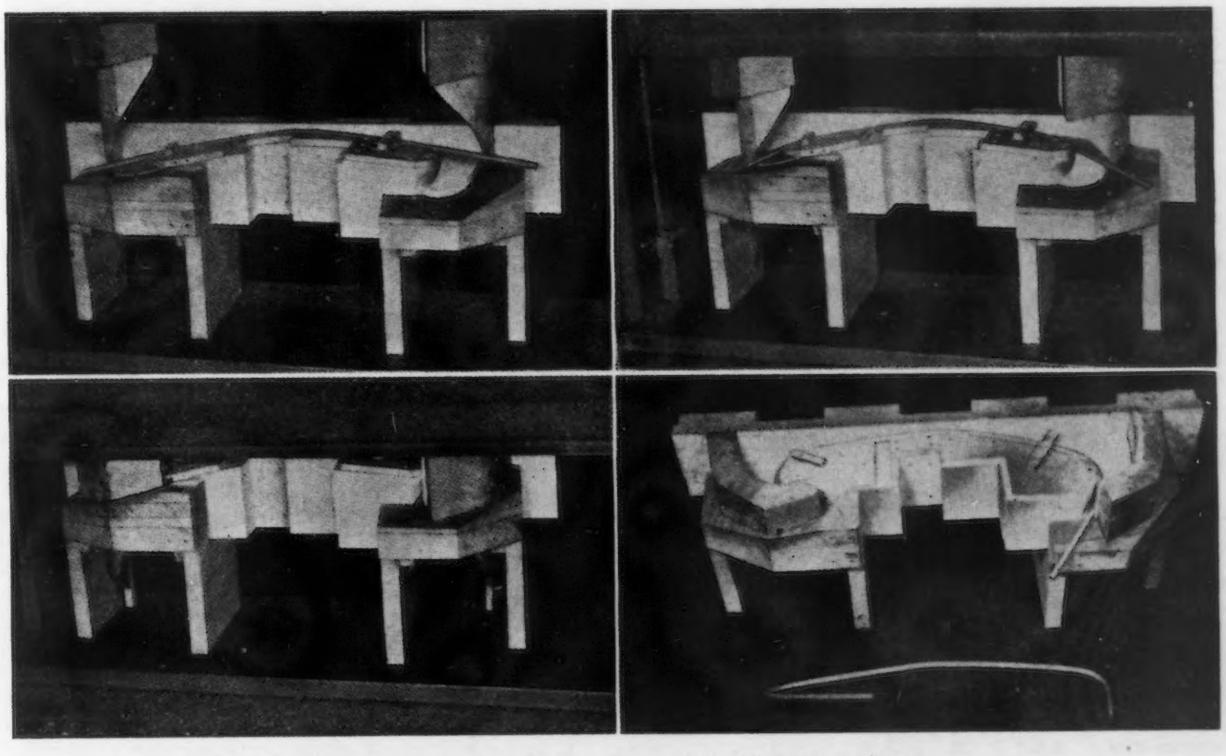
FIG. 1—A screw-feed press for the Blackburn pipe bending process.

Fig. 3 shows the half-way position, and Fig. 4 the end of the stroke. On the return of the press ram, the pipe is left bent to shape, as shown in Fig. 5.

Wedging Action in Forming

Considerable use is made of the wedging action normal to the press stroke in many difficult bends. An example is Fig. 6, which shows the gradual forming of the bends through the forcing down of the pipe by the upper tool. Fig. 6 (left) shows the tools exploded, from which it may be seen that the fixed portion of the die is in two parts, the upper part being retained in position during the working stroke by means of battens. The punch consists of a number of wood blades that slide in slots cut in the top of the die and actually press the pipe down and around the die formers. In this example, the bending is entirely normal to the stroke, and after the stroke the die may be lifted apart for the removal of the finished part.

This use of the helical faced punch is illustrated further in the next examples; the principle is frequently employed in the production of bends of the pothook variety, which are easily produced in



Four stages in producing a pipe with bends in two planes.

Fig. 2 (upper left)—Start of the stroke.
Fig. 3 (upper right)—Mid-point of the stroke.
Fig. 4 (lower left)—End of the stroke.
Fig. 5 (lower right)—The finished pipe.

RIGHT

FIG. 7—Using a helical punch to form a pothook bend. On the right are shown half and full stroke stages in forming.

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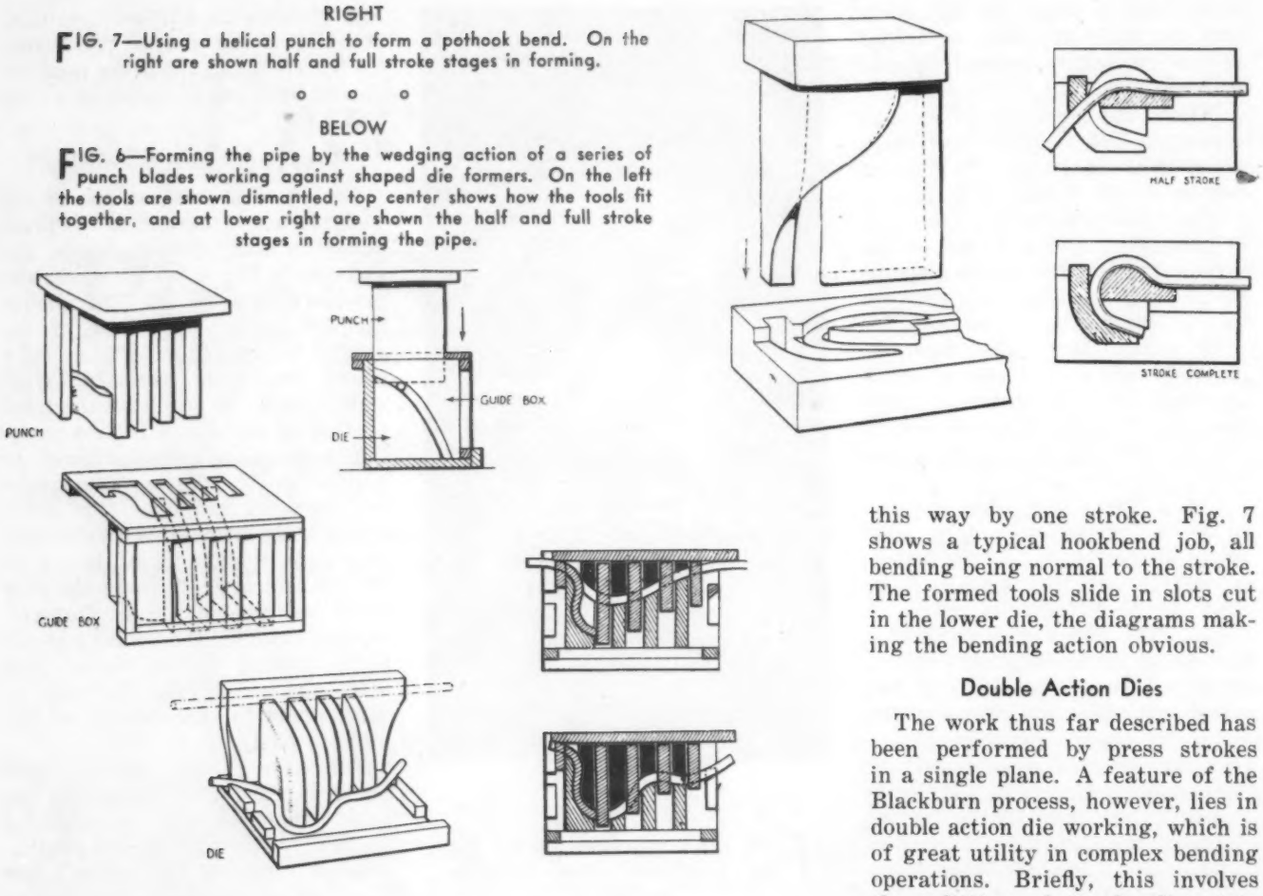
BELOW

FIG. 6—Forming the pipe by the wedging action of a series of punch blades working against shaped die formers. On the left the tools are shown dismantled, top center shows how the tools fit together, and at lower right are shown the half and full stroke stages in forming the pipe.



this way by one stroke. Fig. 7 shows a typical hookbend job, all bending being normal to the stroke. The formed tools slide in slots cut in the lower die, the diagrams making the bending action obvious.

Double Action Dies

The work thus far described has been performed by press strokes in a single plane. A feature of the Blackburn process, however, lies in double action die working, which is of great utility in complex bending operations. Briefly, this involves the splitting of the bending into two operations, usually carried out at planes perpendicular to one another, with the same dies being employed for each operation. After the first series of bends has been completed, the punches and die are clamped in the closed position, the whole set-up is turned on its side and a second set of punches inserted in grooves or ways provided for a second operation.

An example of a job of this kind, involving more than one operation, is illustrated by Figs. 8 to 11. In Fig. 11 the finished pipe is seen in front of the last operation die in an inspection fixture. This part is 7 ft. long before bending and ¾ in. in diameter, and it is completed in four operations. Completion of the first bending stroke of the press is shown in Fig. 8. Two wedges or cotters have been inserted in the die to hold the punch and die in the closed position. Next, the complete forming unit is turned on its side, as in Fig. 9, and a second set of punches mounted above the pipe, so that when forced down they impart bends in a plane perpendicular to the first. These punches slide in grooves which locate them correctly in the die.

TABLE I

Effect of Bending on the Wall Thickness of the Pipe

Material	Diameter, In.	Bend Radius, In.	Inner Wall, In.	Outer Wall, In.	Nominal Wall Thickness, In.
Tungum	1	3.5	0.03	0.027	0.028
Tungum	1	3.5	0.031	0.025	0.028
Tungum	0.75	3.375	0.032	0.026	0.028
Tungum	0.75	3.375	0.03	0.026	0.028
Tungum	0.75	1.625	0.034	0.025	0.029

TABLE II

Pipe Bending Production Times by Blackburn Process

Material	Pipe Dimensions			Time Required by Coppersmiths		Time Required by Press	
	O. D., In.	Gage	Length, Ft.	Hr.	Min.	Hr.	Min.
Copper	0.75	20	1.5	3	15	..	33
Tungum	0.625	22	5.00	9	..	2	33
Tungum	1	22	8.5	9	..	3	..
Tungum	0.75	22	8.5	7	..	2	45
Tungum	0.625	24	4.5	2	25	..	38
Tungum	1.5	22	3.66	5	30	..	58
Tungum	0.75	24	2.75	4	15	..	56
Tungum	1	22	3.75	4	35	..	48
Aluminum alloy	0.5	24	6.00	2	..	1	2
Aluminum alloy	0.5	24	5.00	2	..	..	54

The pipe is then removed from the first fixture, and, for the further operations, the finished portion is held in another fixture which locates it ready for the third set of bends in Fig. 10. When the punch descends, it is held in the closed position by two wedges as before, and this fixture is turned on its side. A final operation, by tools fitting into grooves in the die, is then carried out, as shown in Fig. 11, to complete the set of complex bends seen in the pipe in the lower part of the illustration.

Before the bending operation, pipes are first prepared by being cut off to proper lengths and squared on the ends. Copper and aluminum are annealed before processing. Tungum pipes are worked in the condition as supplied to specification. After being cut to length, the pipes are filled in the normal way. For simple bends the filling used may be resin. One end is fitted with a wood or lead plug, and the molten resin poured in, after which the pipe is allowed to cool before bending. For more difficult bends, the filling recommended is Cerrobend*, a special readily fusible alloy that possesses properties making it particularly suitable for use in this way.

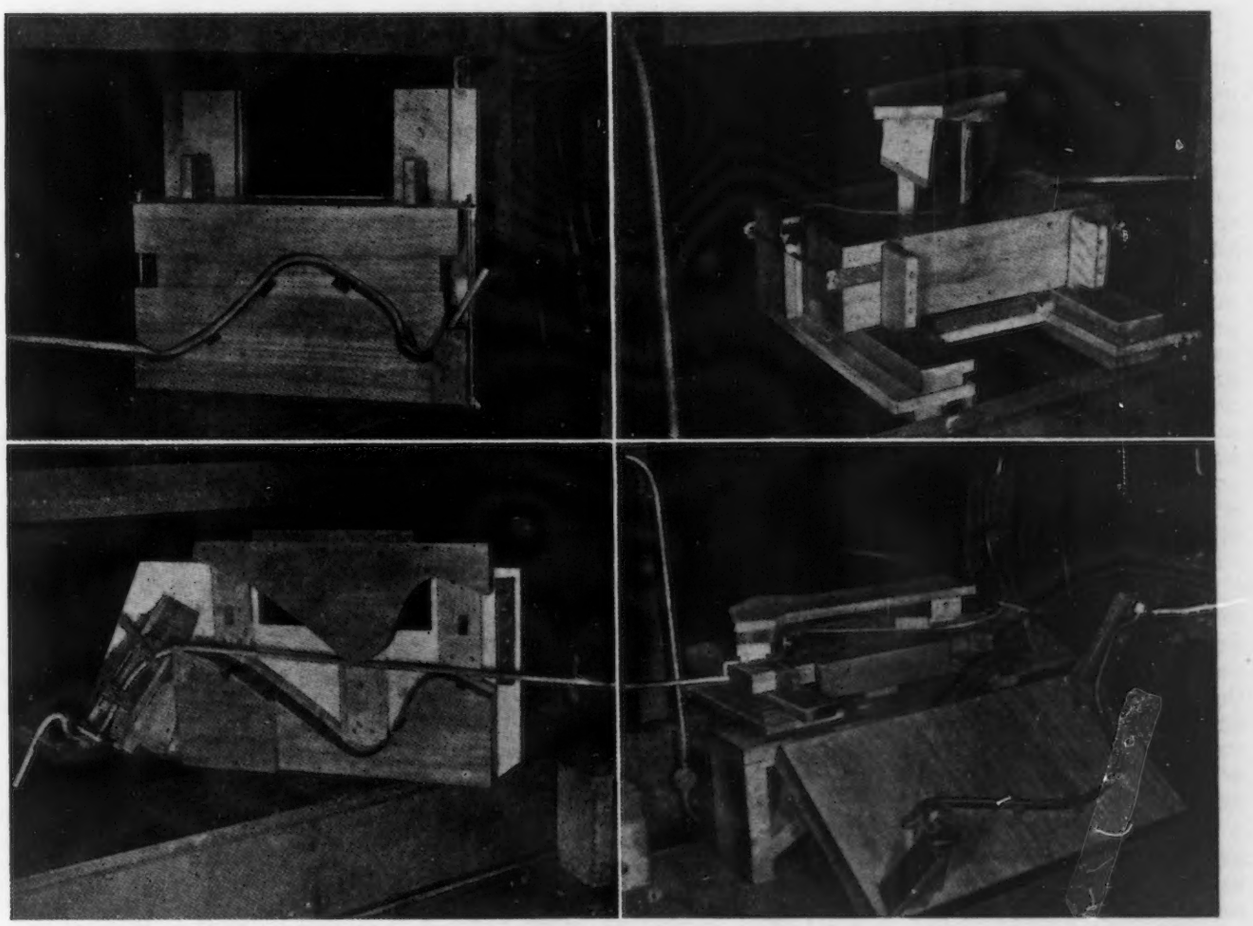
**The Cerrobend filler is described in "How to Bend Tubes and Sections," THE IRON AGE, Nov, 7, 1940.*

After tooling up and greasing the punch and die, the required bending operations are carried out, after which the part is checked by a template that indicates the relative end positions and a number of intermediate points. One great feature of the method of bending employed is its constancy, as once the tools are correctly made the template is used principally for marking off to length.

Wall Thickness

Some queries naturally have been raised as to the possible effect of the bending process on the thickness of the pipe walls. As with all methods of bending, a reduction of thickness was to be expected on the outer radii and a similar increase in wall thickness on the inner radii. Extensive tests have been carried out by sectioning a series of pipes after bending to ascertain whether this effect was in any way excessive, but the results prove that the process is eminently satisfactory in this respect. In Table I a typical series of test results is given from which it will be seen that the variation in wall thickness is well within the limits allowable, the variation being in some cases only of the order of 0.002 in.

A selection of production times for typical aircraft components with comparative figures for handwork is shown in Table II. In comparing these times, the difference in weekly wage rates between that of the coppersmiths and the press operators (semi-skilled labor) should be taken into account.



Figs. 8 to 11—Bending a pipe with double action dies.

Fig. 8—End of the first stroke.
Fig. 9—Punch and die turned on side for the second bend.
Fig. 10—The pipe transferred to a second fixture for the third bend.
Fig. 11—The second fixture turned on its side to complete the bends.

Crystallization of

By BERNARD P. PLANNER
Consultant, New York

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ESTHETIC viewpoints can no longer play a part in these days when an unprecedented defense program, with partly limited supplies of metals, calls for complete utilization of all available stocks; and for this reason the electro-deposition of metals for purely beautifying purposes has been eliminated.

The electro-deposition of metals, however, has become important both as a means of protecting the base metal and applying a desirable metal coating in an economical manner. Electroplating properly carried out presents one of the best means of protection and conservation of the base metal.

With an estimated annual consumption of 90,000,000 tons of iron and steel as against no more than 5,000,000 tons of non-ferrous metals, it must be obvious that in many instances iron will have to be used where only non-ferrous metals or high-grade ferroalloys have hitherto been employed. In the majority of cases, however, this can be done only if the surface is perfectly protected, either by a transformation of the base metal surface proper or by the application of a layer of metal. For the sake of economy, such a layer or plating must be as thin as possible, and, owing to its protective property, must impart the properties of the deposited metal to the entire piece.

Although for certain purposes the hot-dip process is particularly well suited, it is a remarkable and economically important feature that electro-deposition of metals, under certain conditions, changes the structure and physical properties and permits control of the thickness of the metal coating.

The general requirements of a metal coating meant to protect the base metal perfectly are: (1) The coating must be compact and impervious, or non-porous, (2) the coating must firmly adhere to, and bond with, the base metal to avoid chipping or peeling with subsequent mechanical treatments, (3) the coating must uniformly cover the entire surface of the base metal, with an even layer thickness, (4) for reasons of economy, the coating must give absolute protection, that is, it must be entirely free from pores and impervious with the least possible layer thickness, (5) for reasons of economy and to step up production, the density of the current used and the efficiency of current and electrode must be as great and as constant as possible, and (6) the coating must be sufficiently hard, yet at the same time ductile enough to assure easy buffing and polishing. For this reason it must also adhere perfectly.

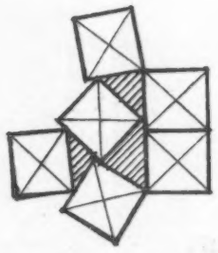

FIG. 1—Voids in a plated surface are formed by the intergrowth of the metal crystals. Here, intergrowth of the crystals is shown at edges and corners of the crystal structure.

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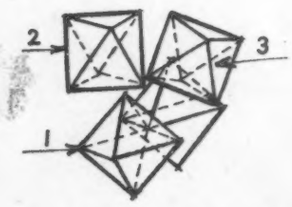

FIG. 2—Intergrowth of the crystal of a plated metal is shown here in three possible forms, (1) corners, (2) edges and (3) faces.

The intergrowth of the metal crystals in electro-deposition will take place either at (1) corners, (2) edges, or (3) faces as shown in Figs. 1 and 2, where body-centered crystals are shown. Voids will form which at first do not grow together. The crystals increase in size and grow into the solution, partly entrapping some electrolyte yet partly failing to bridge the voids.

For lack of foreign substances, or addition agents, a pore-free metal deposit cannot be obtained with certain, rather simple, solutions, not even when the coating is very thick. On the other hand, there are many agents that are apt to diminish the size of the crystals yet do not extinguish the crystallization completely. It is obvious that as crystals become more marked and larger, the electro-deposited metal layer will be the less dense. Conversely, the finer the crystals are, the thinner will be the coating covering the voids; or, in other words, the thinner will be the pore-free coating that is to insure the desired impermeability. The question is: "What are the agents that influence the size of the grain?"

Grain Size Influences

In trying to answer this question, mention must be made that progress in this field has been largely empirical; that theories chiefly dealing with the effects of "additional agents" do not fully account for the phenomena observed; and, lastly, that the influence of the various factors sometimes can hardly be discovered and examined separately, as it is the concurring influence of a group of factors that must be considered.

In the first place, there is the in-

Metals *from Aqueous Solutions*

. . . An explanation of the importance for fine grain crystallization of plated metals, along with a discussion of the influencing factors, is given herein. The author's views, while not shared completely by certain American workers, are based on many years of practical experience in Europe.

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fluence and orientive effect of the basis metal that frequently is not sufficiently taken into account. The crystals of the deposited metal are sometimes in sequence with the crystals of the basis metal (pseudomorphosis), although they may show variations in lattice parameters. This is a purely physical, that is, a crystallographical, influence. Needless to say, the basis metal must be clean and uniform, as loose particles, cracks, and scratches will cause a disturbance of the orientation of the crystal growth and occasionally will cause pitting. Absolute smoothness and uniformity of the surface of the basis metal are also requisite in view of the necessity to keep to the "minimum thickness" that insures protection to this metal as low as possible to serve the purpose of greater economy. Cold rolled sheets that have the required surface quality have been rolled on the modern continuous mills in this country. On the other hand, however, a rougher surface, showing scratches and intersections, will insure better adhesion.

Another important factor influencing both grain size and crystallization is the type of metal salt dissolved in the electrolyte from which the metal is being precipitated. It has been found that the crystallization of the deposited metal is influenced by the salt in solution. Chromium, for instance, may be deposited in body-centered cubes and in close packed hexagonal forms. Cobalt will show face-centered and hexagonal forms. It appears that the formation of cubic, octahedric, and body-centered crystals generally promotes the formation of dense and impervious coatings.

Many deposits, particularly those derived from simple solutions, show a columnar structure. This is due to the anisotropic rate of crystal growth in a direction perpendicular to the cathode. Crystals of this nature are frequently not only large, but grow isolated from one another with the result that the coating becomes worthless.

Complex solutions, on the other hand, with ions of high molecular weight, yield crystalline forms so finely grained that they can hardly be resolved in a microscope. It is this kind of solution that is best suited for the purpose. However, not the type of crystals alone, but also the manner of their intergrowth and lateral cohesion is of importance.

Effect of Current Density

The attempt has been made to determine rules, of general applicability, by which the current density exerts its influence. Thus, it was found that high current densities and high cathode potentials will usually favor the formation of smaller crystals. Higher current densities are also believed to accelerate the formation of crystal nuclei. Current density, however, cannot very well be examined without consideration of the concentration of the electrolyte, as this is a factor that influences the ratio between the formation of crystal nuclei and the growth of the crystals.

The higher the concentration of the electrolyte, the more ions and crystal nuclei will be available for discharge and precipitation around the cathode. Concentrated solutions, leaving neither the time nor offering the space for the crystals to grow, will produce dense coatings with small crystals. Conversely, a solution of low concentration with but few ions and nuclei to allow the formation of crystals, will give the crystals both time and space enough in which to grow so that there will be large crystals.

Higher current density, therefore, requires a higher concentration of the electrolyte. This has its limits, however, because the application of too high a current density even to a highly concentrated electrolyte, desirable though for the sake of greater economy, would deplete the cathode film of ions. Aside from other disturbances, this alone would result in a poor coating and lower the current efficiency. For every electrolyte there is a current density beyond which the deposited metal will turn spongy, no matter how quick the agitation.

A ready means to replenish the solution with ions at the electrode surface and to keep the bath uniform is agitation of the bath. However, care should be taken so that only clear and well filtered baths are used, the most essential of general requirements, lest sludge and impurities be whirled up and co-deposited.

Another means to cope with the phenomenon of depletion and to avoid spongy and powdery deposits is to increase the supply of dischargeable ions. This is done by raising the temperature of the bath, which accelerates diffusion

Fiftieth in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

and lowers resistance against the precipitation of the metal ions. A high bath temperature will, no doubt, accelerate crystal growth and cause coarser crystallization. As a rule, 104 to 113 deg. F. is considered to be a very satisfactory bath operating temperature range.

Metals of a marked negative character, such as zinc, chromium, cadmium and iron, require a certain degree of acidity, usually with a pH below 2, when acid baths are used. Otherwise, metal oxides and hydroxides would be co-deposited, disturbing the crystallization and causing spongy deposits. The over-voltage of hydrogen prevailing on the surface of such spongy deposits would decrease, thus accelerating the liberation of hydrogen, which, in turn, causes a further decrease of acidity. Too high an acidity will, in a purely chemical way, redissolve the metal deposited.

Addition Agents

The most complex and widely disputed phenomena in the field of electro-deposition of metals are certainly the so-called "addition agents." While there is no question as to the favorable effect of addition agents on the crystal structure and the properties of the deposits, opinions as to the effects of addition agents are at variance.

Of the colloids and addition agents most beneficially employed, the following deserve mentioning: Carbon disulphide, rubber, gelatine, glue, dextrine, seed gluten, such as linseed, tuber gluten (salep), glutinous plant saps and extracts, albumen and its transformation products of animal and vegetal origin (glutin, contrin, mucin), glycosides, phloroglucides, such as licorice root, and lastly, inorganic colloids, such as colloidal aluminum hydroxyde and silicid acid. Since some of those products cannot always be obtained of equal composition, it is worth mentioning that there has been a recent tendency to use crystalloid organic compounds of a definite composition and molecular structure, such as sulphonates, notwithstanding the difficulties of obtaining them pure.

One group of scientists holds that the metal cations discharged at the cathode turn colloid and remain so because of the added protective colloids. There complex colloids are eventually electro-osmotically pressed onto the cathode, together with the aforementioned addition agents or the colloids formed thereof.

Another opinion propounded is that the colloids form the "cathode film," that is, a layer of solution in contact with the cathode wherefrom the metal deposition issues. Its constitution, being viscous and thus different from the rest of the solution, renders diffusion more difficult. Such a viscous cathode film compels the crystals to grow only in a direction parallel to the surface of the cathode, causing horizontal "bending." The latter is particularly characteristic for bright nickel deposits. Crystal orientation of this nature is likely to be caused by colloids contained in the solution. Some authors believe that the colloids simply bring about the formation of a great number of nuclei, out of which the crystals begin to grow. For lack of space and time, however, the crystals prevent one another from keeping on growing so that a very fine crystallization ensues.

The addition of colloids is, however, not always beneficial. Quantities in excess of the one found satisfactory will cause a sudden deterioration of the color and physical properties of the metal deposit so that the metal will come out spongy. Lastly, it should be said that it is very difficult to watch the effects caused by the colloids separately from those brought about by acidity, or those due to current density, concentration, etc.

In addition to colloids, capillary-active substances are sometimes used in the solutions. Capillary-active substances are substances that will decrease the surface tension, such as organic acids, alcohols, and esters. For most experiments made by the author, caffein, phenol, and tannin were used. Addition agents of this kind are similar to the colloids absorbed by the cathode film and act in a similar manner. Their selection and addition must be performed empirically, and the amounts added should not exceed a given quantity.

Hydrogen Discharge

Lastly, the discharge of hydrogen and its influence on the electro-deposition of metals must be considered. All aqueous solutions contain hydrogen ions. Hydrogen is always discharged, the quantity of discharge depending upon: (1) The concentration or the pH value, (2) the over-voltage at the respective cathode metal, and (3) the actual polarization. The over-voltage at the respective cathode metal, in turn, is subject to other factors. According to the ratio between the eventual evolution voltage of hydrogen and the potential necessary for the deposition of the metal, a larger or lesser quantity of hydrogen will be discharged.

Such a discharge of hydrogen, released by the decomposition of water or complex cations, will cause gaseous hydrogen to be entrapped in the metal deposit, hydrides or solid solutions to form or, lastly, the simultaneous combination of these features. Experimentally, it is rather difficult to identify these forms of hydrogen as to their respective quantities.

No matter what form of hydrogen develops, it exerts a marked influence on the deposited metal as to its hardness, ductility, or brittleness. It has been found that hydrogen sometimes increases the hardness of nickel, chromium, copper, and platinum metals beyond their hardness in a work-hardened state. Conversely, it decreases the hardness of zinc, tin, and lead, and the result varies in so far as iron is concerned. It has proved possible to deposit, under certain conditions, analytically pure iron soft enough to allow cutting by knife. This valuable property was largely exploited during the first World War, serving as a substitute for copper in the manufacture of driving bands for shells.

To a certain extent, the hardness may be subject to the influence of various factors such as current density, addition agents, the presence of various cations and anions, or a preferred orientation of the crystals. There is no doubt, however, that the co-deposition of hydrogen is the dominant factor. Since the evolution or deposition of hydrogen will consume a certain

amount of electric current, it is undesirable from an economical point of view. The fact that hydrogen affects most unfavorably the adhesion of the coating to the basis metal is even less desirable since the coating will chip or peel off. In addition, the formation of gas vesicles may result in porous deposits that will be compressible to a fraction of their original volume. Thus, unless special requirements must be met, the process should be arranged so as to keep the development of hydrogen as low as possible.

Polarization Effects

There is not much purpose in discussing the effect of polarization and electrode potentials, since they can hardly be considered in the field of industrial application. As far as electro-plating of sheets is concerned, this holds good regarding the phenomenon of the throwing power. As the sheets, when passing the narrow space between the electrodes, are exposed to a considerable current density, the throwing power of the solutions practically used will always be sufficient.

When taking the density, or, vice versa, the porosity of the metal coating, for a measure of its protective value and service life, it must be borne in mind that there are two different kinds of coatings. When a rather electro-negative, more readily corroding coating is applied, as for instance zinc or cadmium on iron, the basis metal will be thoroughly protected owing to the electro-motive series, yet at the expense of the coating metal. In such a case, the pores will prove less harmful and may even be covered by corrosion products. If, however, nobler metals are applied on iron, pores will prove far more harmful, as the basis metal will then be exposed to the corrosive agent that might penetrate by way of such pores and get underneath the protective coating.

This discussion explains why it is of paramount importance to obtain metal crystals of as fine a grain as possible (down to the order of 50 Angstrom units), if not crystalline forms that cannot be resolved under the microscope. It is by crystals of an extremely fine graining that the maximum protective value may be obtained from a given quantity of coating metal, or, in other words, an impervious layer of electro-deposited metal of minimum thickness. The finer the graining of the crystals, the better will be the adhesion and the greater the tensile strength and hardness of the electro-deposited metal, thus serving both the purpose of perfect basis metal protection and greater economy.

A theory of general applicability has not yet been evolved. The function of the addition agents, for instance, has not yet been fully understood and sometimes cannot be predetermined. As far as progress has been made in the field, it has been more or less empirical. The complexity of the problem is obvious and it may be that some of the phenomena of the mechanism of the electro-deposition of metals will be worked out in connection with quantum-mechanics and atomic structures.

Yet a few principles and rules of applicability have been found as to the effect of various factors, and some practicable constitutions of solutions have been discovered. This attempt of classification might prove a useful hint as to the progress still to be made in the complex field of electroplating.

German Light Metal Supplies

THE position of Germany regarding mineral raw material production and supply, resulting from an eight-year mobilization of resources through purchase and aggression, as well as internal effort, is reviewed by the Bureau of Mines, U. S. Department of Commerce. In some instances, such as bauxite, aluminum, and magnesium, recent production has been greater than the combined output of the United States, Great Britain, and Canada.

In 1933, the United States output of aluminum was more than double that of Germany, but in 1940 it is estimated that Germany produced 264,550 net tons, against 206,100 tons in the United States. Aluminum production in German-controlled countries: France, Italy, and Norway, and also in Switzerland, in 1940 was 15 per cent greater than the combined output of the United States, Canada, and Great Britain, and amounted to 47 per cent of the world total.

A recent survey shows that the aluminum plants in German-controlled Europe will have a total capacity of 617,300 tons by the end of 1941, compared with about 639,325 tons in the United States, Canada and Great Britain. By the end of 1942 or early in 1943, the productive capacity of the United Nations should exceed 992,050 tons. No data are available on Germany's expansion program.

Germany is amply supplied with bauxite, the raw material essential to aluminum manufacture. Extensive deposits in France, Italy, Yugoslavia, and Hungary are situated in a much more favorable position for transport to the aluminum reduction plants than those from which the plants in the United States and Canada get their supply, principally from Surinam and British Guiana.

Present output in Europe is 50 per cent of the world's production, whereas the western hemisphere contributes only 38 per cent. Both regions have large reserves from which additional production can be obtained, although the western hemisphere is at a disadvantage because of the transportation problem.

No official production figures are published in Germany on magnesium output and estimates vary from 19,850 to 66,150 net tons per year, the most recent being 44,100 tons for the German-dominated areas. In 1940 the combined British-American production was only 13,225 tons. Large plants are under construction in the United States and by the end of 1941, production in the United States and Great Britain was estimated at 44,100 tons. By the end of 1942 or early 1943, the United States alone will be producing magnesium at the rate of 198,400 tons a year.

The New Combat Helmet

. . . Col. René R. Studler, executive office, small arms division of the Army Ordnance Department, recently reported on the development of a superior head armor for the United States soldier in Army Ordnance, a bi-monthly publication of the Army. Some of the salient facts of the report are contained herein.

o o o

WHEN it became evident late in 1940, that the United States was to have an army second to none in the matter of equipment, the problem of a new type of helmet was presented. In the light of events in Europe, it was apparent that a washbasin-type helmet, originally designed to protect soldiers in trenches from fragments of shells bursting overhead, would not be adequate in a war of movement where missiles could come from all directions, even from below, as in the case of parachute troops.

The problem of developing a satisfactory shape for a helmet was given to the Infantry Board, the first step being to determine the essential characteristics of a helmet. The problem of obtaining a satisfactory suspension was attacked concurrently with the development of the helmet rather than as an afterthought as was previously the case. The World War helmet was taken as the most suitable for protecting the top of the head. By trimming off the brim and welding to the remaining dome-shaped piece a visor and skirt-like extensions to protect the sides and rear of the skull, a pot-type helmet was obtained, which was then fitted over what may be considered a modified football helmet. This helmet was then adjusted to give greater vertical vision and to allow more room on the sides for indentations caused by missiles.

It was discovered that the football-helmet type of suspension was superior to all other methods of holding the helmet on the head. Accordingly, a fiber liner fitting snugly to the inside of the helmet, was constructed, using the football-helmet type of suspension. When covered with Olive-drab cloth, this liner presented a surprisingly neat appearance—not unlike a tropical helmet.

The reaction to the TS-3 helmet, the official name of the new headpiece, was entirely favorable. By bringing the sides of both the helmet and liner well down over the head, not only was greater protection for the skull assured, but, the center of gravity of the combination helmet and liner was brought closer to the center of gravity of the head, thereby allowing helmet and head to move as a unit. This eliminated much of the rocking that was such an unpleasant feature of the First World War helmet. Additional tests showed that the TS-3 helmet did not interfere with rifle firing from any position; did not obscure the field of vision too greatly; and was more comfortable to wear.

Since the promise shown by the TS-3 helmet was judged sufficient to warrant further development, the McCord Radiator Co. (see THE IRON AGE, Dec. 18, 1941, page 94) was requested to make up a number for extended-service and ballistic tests. For this purpose, presses capable of stamping out helmets in a single draw were used. Hadfield manganese steel, the same as was used in the World War helmet, was chosen for the new helmets. While the specifications for the M1917 helmet required it to resist penetration by a 230-grain, caliber .45 bullet with a velocity of 600 ft. per sec., the performances of these new helmets indicated that the actual ballistic limit was much higher. Therefore, the requirement set up for the TS-3 helmet called for resistance to penetration by a similar bullet with a velocity of 800 ft. per sec. In other words, the new helmet should not be penetrated by a bullet from the service pistol fired at point-blank range.

Service tests on the production model of the new helmet confirmed earlier opinions as to the excellence of the TS-3 design; it was all that could be expected—and more. As for the ballistic qualities, the conclusion contained in the report submitted by Aberdeen Proving Ground is as follows: "The experimental helmet, TS-3, is ballistically superior to the requirements for a military helmet."

Production of the helmet is now mounting rapidly—soon it will be a familiar sight around Army camps, and before long every American soldier will be equipped with the finest helmet that science and engineering skill can produce.

Silver Coatings by Vapor Condensation

NEW applications of silver coatings applied by vaporization methods have been found recently and appear likely to increase when their properties and relatively low cost become more widely known. A coating only 0.000005 in. in thickness is substantially opaque and has the characteristic appearance, as well as other properties, such as high reflective ability. That silver possesses. Tarnishing of the exposed surface must be avoided in most cases, but this is possible under many conditions. Applications on transparent plastic sheeting has possibilities and such coatings have brilliant luster when viewed through the plastic, making the sheeting applicable in place of tin and aluminum foils for some purposes. Naturally, such films are not entirely free from porosity but this is true of nearly all thin films, however formed.

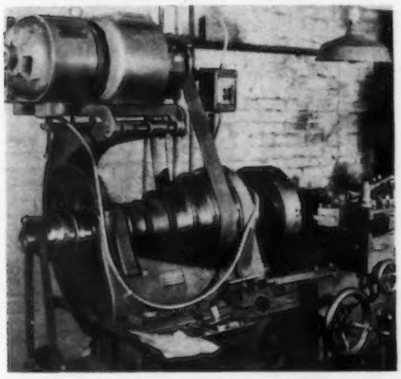
Reflectors, especially those of glass, are now being coated with silver in large quantities, especially where the surface is later subject to and kept under high vacuum, as in lamp bulbs of certain types and in vacuum bottles. Under such conditions, silver is displacing badly needed aluminum, and provides higher reflecting properties. Silver can be coated onto refractories having di-electric properties to form condensers, many of which are needed in radio and related applications.

New Equipment . . .

Power Plant Apparatus

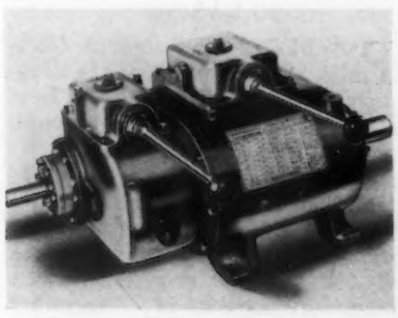
Several new and redesigned machine tool transmissions are described in this week's news, along with couplings, bearings and V-belt drives, all designed to improve plant efficiency and speed up production.

A MOTORIZED variable speed drive now being manufactured by *Reeves Pulley Co.*, Columbus, Ind., eliminates the necessity of building a special support for mounting Reeves variable speed control units on machine tools. The assembly can be attached to most tools with four cap screws, and is provided with jack screws to maintain belt tension. It utilizes either the Vari-Speed MOTODRIVE or the countershaft type Vari-Speed Motor Pulley, providing an infinite range of speeds at the turn of a handwheel. Sizes range from ¼ to 10 hp.



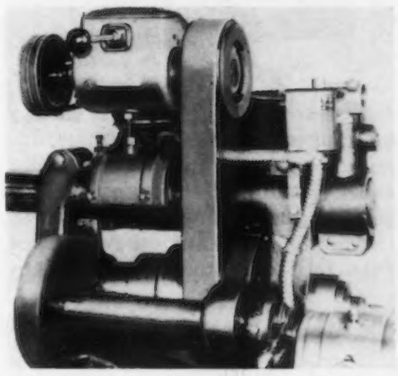
Machine Tool Transmission

WESTERN MFG CO., 3428 Scotten Avenue, Detroit, announces the introduction of a new transmission of 30 hp. capacity for motorizing cone driven machine tools. Designated as the Western SUPER, the unit has eight changes of speed in geometric progression of 1.29, with a maximum reduction of 6 to 1. It is suitable for replacing gear boxes on large boring mills and radial drills, as well as for motorizing slotters, engine and turret lathes.



5 hp. Transmission

THE MASTER transmission built by *Western Mfg. Co.*, Detroit, has been redesigned by moving the shifting lever into the main body of the transmission to provide a more positive action. This model, for 1 to 5 hp. motors, is similar to other units in the company's line in that three types of brackets are available. One bracket is designed for motorizing lathes, automatics and similar tools; a second can be fitted to shapers, boring mills and vertical mills, while the third type is intended for use on milling machines.

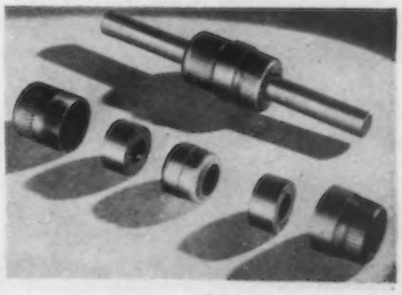


Tachometer

FOR use in measuring r.p.m., ft. per hr., and gal. per min. in plants where rotating equipment is used, a new a.c. tachometer is announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. Known as type A-80, the tachometer consists of an a.c. generator and a rectifier type voltmeter. No brushes or commutator are used in the permanent magnet inductor type generator. Although the best generator speed is 1000 r.p.m., the tachometer is recommended for operation over a range from zero to 5000 r.p.m. Overall accuracy of the device is ½ of 1 per cent of full scale.

Flexible Shaft Coupling

PINS, keyways, special screws and wrenches are not required by the new TORFLEX couplings, marketed by *Harris Products Co.*, 5421 Commonwealth Avenue, Detroit. The couplings consist essentially of two metal caps, two



rubber bushings and a metal spacer. When the caps are tightened, they force the rubber bushings and a metal spacer. When the caps are tightened, they force the rubber bushings against the spacer, tightening the bushings against the shaft. Built for shaft sizes from ¼ to 1¾ in., the couplings can be used with different size shafting at each end. Only one shaft need be prepared for the coupling. This consists of filing or turning a 1/16 in. groove around the periphery of the shaft. Torque capacities range up to 825 in.-lb. at recommended usages.

Bearing Covers

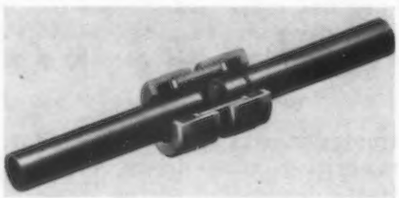
WITH the approval of all leading manufacturers of ball and roller bearings, standard covers in a complete range of types and sizes have recently been developed to form a dust and grease tight enclosure for the bearings. These covers, which eliminate the need for designing special protection for bearings are manufactured by *R-S Products Corp.*, 4530 Germantown Avenue, Philadelphia.

Hydraulically Controlled Transmission

SAID to be the largest variable speed transmission equipped with automatic hydraulic control, a new unit built by the *Reeves Pulley Co.*, weighs 4300 lb. It transmits 26 hp. at maximum speed, and provides infinitely variable speeds over a 3 to 1 ratio. The automatic hydraulic control is used to maintain uniformly high peripheral speed on a veneer cutting lathe as it turns a log from its full original diameter down to the smallest practical size.

Oil-Carrying Coupling

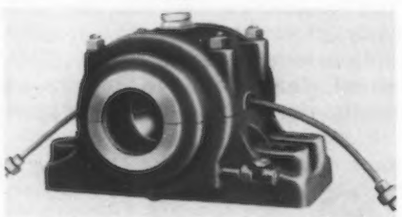
A NEW addition to the TORFLEX line of the *Harris Products Co.* is a flexible coupling which can serve as a connecting medium in lubricating oil lines. Like the rest of the line, this type "D" coupling uses metal caps which



force rubber bushings to grip the shaft. Maximum torque capacity is 45 in.-lb., and shaft sizes are ¼ to 5/16 in.

Pillow Blocks

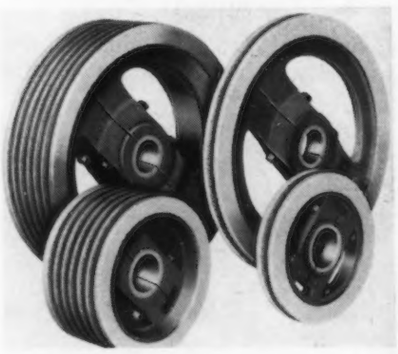
SLEEVOIL pillow blocks are now available in plain and water cooled types for shaft diameters from 1 7/16 to 8 in. *The Dodge Mfg. Corp.*, Mishawaka, Ind., manu-



factures them for a wide variety of applications ranging from fans and blowers to marine propeller shafts. Fully self alining, and sealed against admission of dirt or escape of lubricant, they can be furnished in either expansion or non-expansion types. The latter form is fitted with two internal split thrust collars. It should be used as an anchor bearing, the other bearings on the same shaft being of the expansion type.

Wood Sheaves

IN tune with the times, the *Dodge Mfg. Corp.* is offering a wooden sheave for V-belt drives as an alternative for metal sheaves. Its efficiency is said to be equal in every way to that of metal, except where flywheel effect is essential.



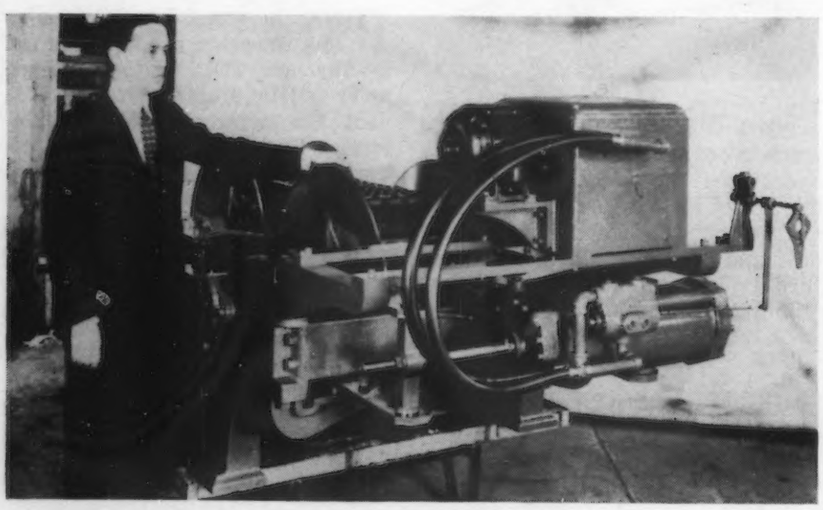
Called VICTORY sheaves, they have been fully tested by the company over a 10-year period, and are offered in composite groove types for A, B and C section belts in a wide range of sizes.

Porous Iron Bearings

THE KEYSTONE CARBON CO., St. Marys, Pa., announces the addition of SELFLUBE porous iron bearings to its line of porous bronze bearings. The iron bearings, which are stronger than porous bronze bearings, are interchangeable with them in most applications. Average porosity is 25 to 35 per cent, and they are said to have a low friction coefficient. Introduced to conserve copper, the bearings are available in a wide variety of standard and special shapes.

Nickel Babbitt

POWDER Nickel Genuine Babbitt, a development of the *Magnolia Metal Co.*, Elizabeth, N. J., is a new material for bearings subject to high pressures and temperatures. Its tensile strength is 17,500 lb. per sq. in., and the yield point is 65,000 lb. per sq. in. The babbitt has a pouring temperature of 950 to 1000 deg. F., and a Brinell hardness of 27. The nickel



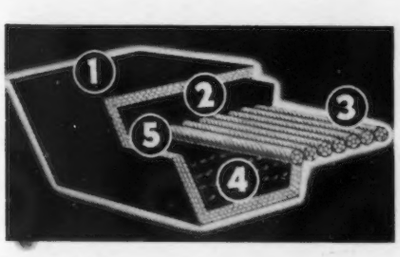
treatment is said to give the metal a hard glossy surface, desirable in high speed applications; and its strength adapts it for use under heavy loads.

Colloidal Graphite Oils

ESSO MARKETERS announce the introduction of VAN CALORIA, a group of oils containing colloidal graphite. Under the temperatures, up to 400 deg. F., for which the lubricants are designed, the oil gradually vaporizes, leaving no residue from the oil itself, but only a fine film of "dry" colloidal graphite. Thus the graphite serves to prevent actual metal-to-metal contact. The lubricants are distributed by the Standard Oil Companies of New Jersey, Pennsylvania and Louisiana, by Penola, Inc., and by the Colonial Beacon Oil Co.

V-Belt

LONGER wear, a more uniform pull, and better resistance to heat and oil are said to be the principal features of the redesigned *Goodyear* multiple V-belt line. The new belts are sheathed in black, and feature a "compass" cord con-



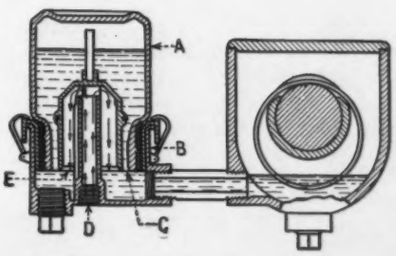
struction to concentrate the load carrying cords in the neutral axis where all pull evenly. The new E-C cord multi V-belt is made in all standard cross sections and lengths, and is sold in sets, matched under operating conditions.

Static Discharging V-Belts

ENGINEERS of the *B. F. Goodrich Co.* point out that belts made of ordinary rubber compounds are non-conductors, and will accumulate static until it reaches such high potential as to discharge in the form of a spark. In the presence of inflammable or explosive mixtures this is a serious hazard. Goodrich is now manufacturing its static-discharging and oil-resistant belting in all popular sizes of A, B and C cross sections. These belts accomplish their static-discharging function through the use of a rubber so compounded as to actually conduct electricity, which flows through the belt and out through the frame of the machine. When the machine is grounded, no possibility of sparking is present. Its conductivity is not sufficient, however, to permit it to act as the bridge for a short circuit between the motor, the machine and the operator.

Constant Level Lubricator

HOLDING a visible supply of oil which is released automatically as required, the OIL-RITE constant level lubricator is



said to insure adequate lubrication and prevent oil waste. It is used on electric motors, pillow blocks, fans and similar applications. Operation is controlled by gravity and vacuum, without the use of moving parts. When used on machines that operate intermittenty, the chamber formed inside the bell provides adequate surging capacity for oil flowing back to the lubricator. *Oil Rite Corp.*, 3466 South 13th Street, Milwaukee, is the manufacturer.

Patch Vulcanizer

A NEW tool for maintenance of conveyor belting in the field, the type RO patch vulcanizer, has been added to the *Goodrich* line. Designed for repairing the covers of conveyor belting, the vulcanizer is round in shape, 10 in. in diameter, of the single heated platen type. It clamps against a steel plate 12 in. in diameter held against the opposite side of the belt.

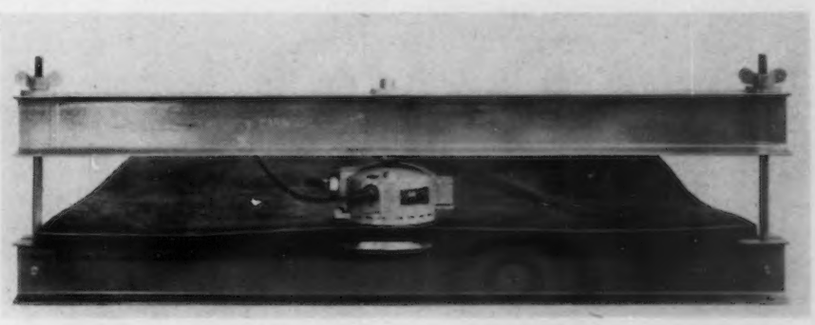
Colloidal Graphite

KONAG "F" is the name given to a suspension in lubricating oil of colloidal natural graphite, manufactured by the National Graphite Co., 17 John Street, N. Y. KONAG "F" is said to produce a tough graphite skin and to step up the lubricating value of oil by breaking down its surface tension and providing a better wetted surface. For general lubrication it is recommended for use as a 10 per cent solution in lubricating oil.

Steel Backed Bearings

A NEW line of TORFLEX bearings, with inner walls of either plain or graphited bronze on steel, is being manufactured by the *Harris Products Co.*, 5408 Commonwealth Avenue, Detroit. Availability of the bearing material in

sheet form assures faster delivery than was possible with cast bearings. The new material has higher shock resistance and a comparatively low coefficient of friction, according to the company. The graphited bronze is recommended for speeds up to 30 r.p.m without lubricant; higher speeds require lubrication.



Tank Turrets Milled on Keller Machines

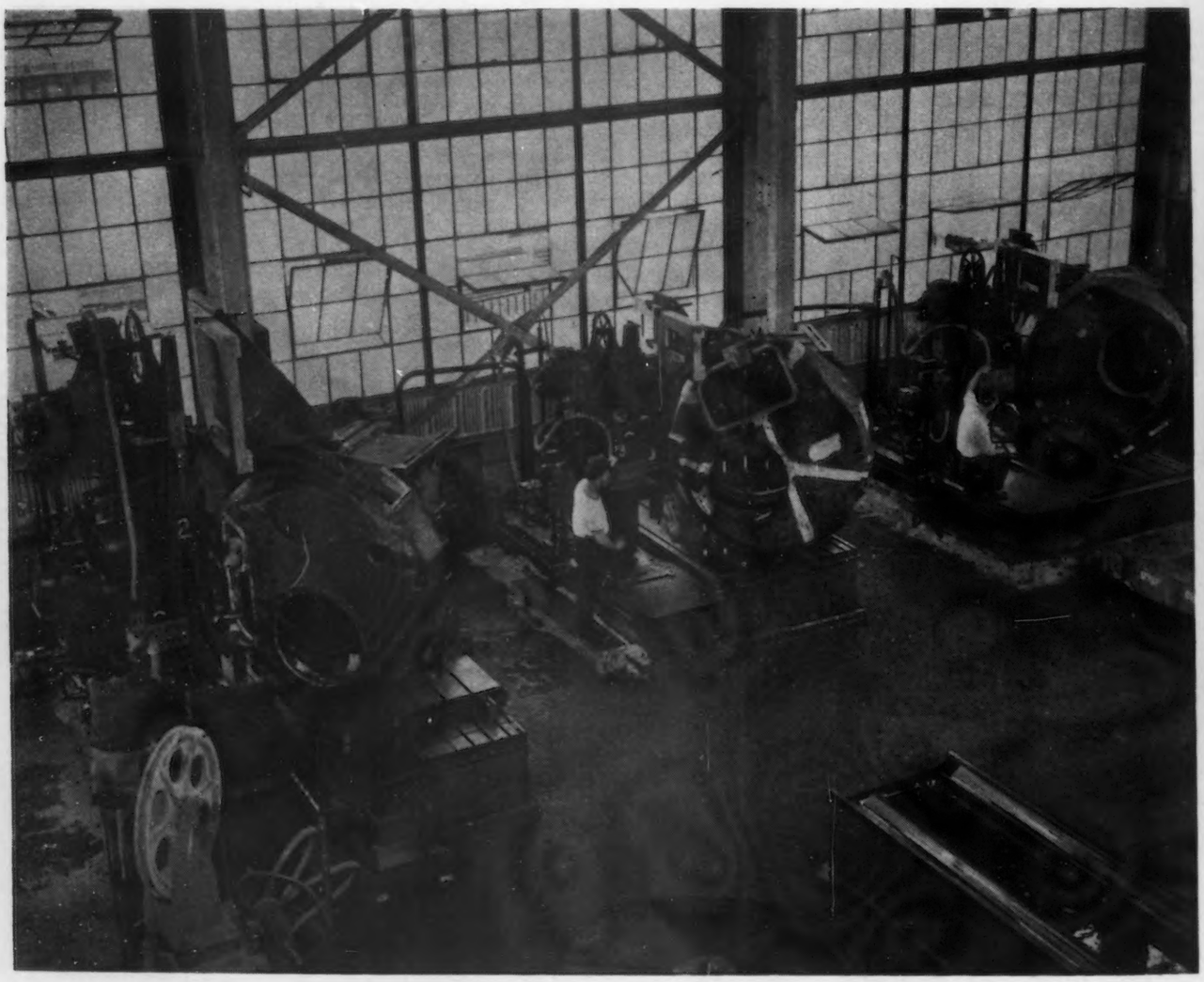
TO obtain ready facilities for the machining of cast steel tank turrets in volume, the Army has turned to the mammoth equipment available in automobile die shops, and, in consequence, a large number of these turrets are being machined on Keller automatic, three dimensional profiling machines and on large vertical boring mills and other equipment which, not many months ago, were turning out dies and tooling for the automotive industry.

A Murray Corp. of America plant, largely because its aircraft stamping program is making use of hand-finished Kirksite zinc alloy dies instead of cast iron dies, is able to devote a major part of its die shop equipment to the machining of tank turrets and castings for shell lathes being built by a national machine tool builder.

Obviously, the set-up time normally required on a Kellering job would have been uneconomic—especially in regard to time, today's all-precious element—so Murray devised special tooling to handle the tank turrets.

Special surface plates—virtually special cast iron tables—were prepared to receive the turret castings. These surface plates are set up on the floor of the die shop and the turrets are mounted on them. The entire set-up job is done here. On later models now being machined, the turret and surface plate are swung by an overhead crane into position on special tilting fixtures mounted on each of the machines. It is then possible to swing the tilting fixture, complete with the surface plate and the turret casting, into position to be machined.

The accompanying photograph shows a series of profile end milling operations being performed on these turrets. The flange openings are profiled according to the shape of the pattern mounted above the work.



Milwaukee Rotary Head Milling Machine

KEARNEY & TRECKER
CORPORATION
Milwaukee
MILLING MACHINES

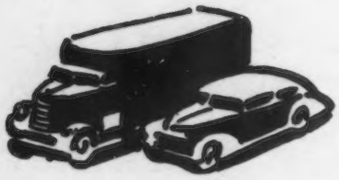
The Milwaukee Rotary Head Milling Machine, primarily developed for tool and die making, is increasingly being used to meet peak production demands on a variety of milling operations. Fast — versatile — flexible — it performs layout, milling, drilling, precision boring and slotting operations with improved accuracy and usually decreases costs.

KEARNEY & TRECKER CORP., MILWAUKEE, WIS., U. S. A.

Milwaukee MILLING MACHINES

Assembly Line . . .

• Salvage drive to strip auto industry of all indispensable tools, dies, and machinery is launched by Council for War production . . . Detroit hears its tanks shattered Germany's Libyan offensive.



DETROIT — An official automotive industry program for stripping the industry of all dispensable tools, dies, molds, flasks, obsolete machinery and other forms of salvageable or scrap metal has been launched under the sponsorship of the Automotive Council for War Production in cooperation with the War Production Board industrial salvage program.

Key to the industry's system is going to be the appointment of a "salvage authority" in each automotive plant to translate the salvage drive into definite action.

This program is seen by some WPB officials as establishing a sort of pattern into which many other industries will be able to fit their particular salvage and conservation program.

The ACWP has established its own pace in this matter, saying to its members in Salvage Bulletin No. 1, dated June 3: "The importance of this program cannot be emphasized too strongly. Decisions affecting the disposal of obsolete and obsolescent material demand vigorous, authoritative action, with the national interests kept uppermost in mind at all times."

The automotive program calls for the disposal of scrap metals through regular trade channels, not by any unusual procedures that would upset the normal flow of scrap.

THE ACWP program is outlined as follows:

1. A complete scrap and salvage program should be in operation in all plants on or before June 15, 1942.

2. Every company should appoint immediately a salvage authority. Such an authority, whether an individual or a committee, should be charged with full responsibility for the discovery and disposal of scrap. Furthermore, because the values of equipment are invariably so relative as to be open to endless argument, it is desirable that the designated salvage authority should be empowered to make final and absolute decisions as to the disposal of all items of questionable value.

(The strongest point in the program is undoubtedly this recommendation to give the salvage authority entirely into the hands of one or a few men, let the chips fall where they may.)

3. Each company's salvage authority should immediately launch a program of scrap recovery to effect as rapidly as possible the maximum use of all equipment of questionable value. The programs of the several plants will, of necessity, vary in accordance with the problems peculiar to their individual operations. Despite the differences of the problems, however, each plant's program should have as its goal the complete salvaging or scrapping of *all* obsolete material.

4. The companies should authorize their suppliers to scrap or otherwise dispose of all obsolete equipment held to company account. Inventories of such equipment should be scrutinized carefully and frequently by the companies' salvage authorities, and decisions as to the fate of questionable items should be rendered as promptly as possible. The salvage authority rendering such decisions should ensure that orders to scrap material are carried out by the suppliers.

5. Though the technics of production scrap control are already highly organized as a matter of standard practice in most automobile factories, they should be reviewed by the salvage authority, and if possible, improved. Special attention should now be given to the refinement of methods of scrap segregation, avoidance of contamination, and speedy return to processors.

6. In addition, to the plant program outlined above, the individual companies should support wholehearted the National Salvage Campaign. It is recommended that such company participation in the national drive should be extended to include dealers and employees.

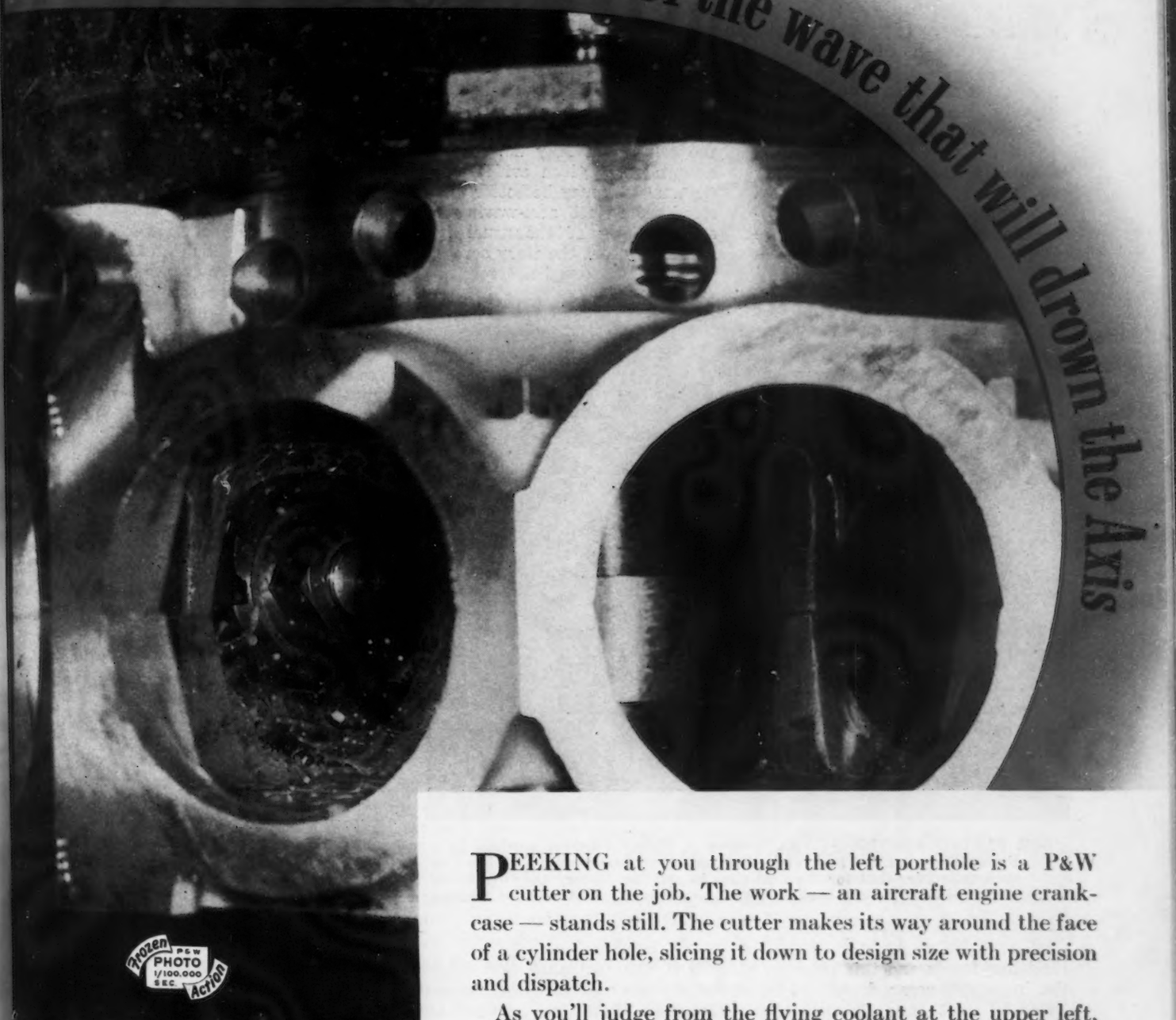
The ACWP even drew up and submitted to its membership forms to be used in listing the name of the salvage czar in each plant and has drawn up forms on which it will receive each month a scrap disposal report from each company. This program calls for reserving only such equipment as that whose loss would impair current or potential production of war material, the maintenance of wartime transport facilities and that required for speedy post-war re-employment of workers.

This latter point expresses the intention of avoiding the destruction of tools, dies or other equipment that would be needed for resumption of automobile production. This rules out the immediate disposal of 1942 dies which has been a hot point of discussion in recent weeks. According to Charles H. McArthur, chief of the industrial salvage section, Bureau of Industrial Conservation, the scrapping of such 1942 dies and equipment "should be reserved until they are vitally needed, and that would depend upon how long the war lasts."

THIS program is going to enable the salvage czar in each plant to exercise discrimination. For example, a forging die which may be obsolete might be salvageable by simply planing off the working surface of the block and sinking a new die in what is left of the block, a common die practice. This would avoid the uneconomic re-circulation of a mass of metal through scrap channels that would be a waste of labor, transportation and steel-making facilities.

The ACWP Salvage and Conservation Committee which worked

ONE SMALL SPLASH *of the wave that will drown the Axis*



Photo—Unretouched

PEEKING at you through the left porthole is a P&W cutter on the job. The work — an aircraft engine crankcase — stands still. The cutter makes its way around the face of a cylinder hole, slicing it down to design size with precision and dispatch.

As you'll judge from the flying coolant at the upper left, this is one of the splashiest jobs in metal working — which indicates the cutting speed and power of this P&W cutting tool.

Wherever *accurate* cutting is vital in American industry, P&W cutters, taps, dies, reamers, and end mills now are pounding out production 24 hours a day . . . hastening the time when we'll return a solid sock in the face for that slinking stab in the back.

Don't spare the pressure. Your P&W tools can take it.

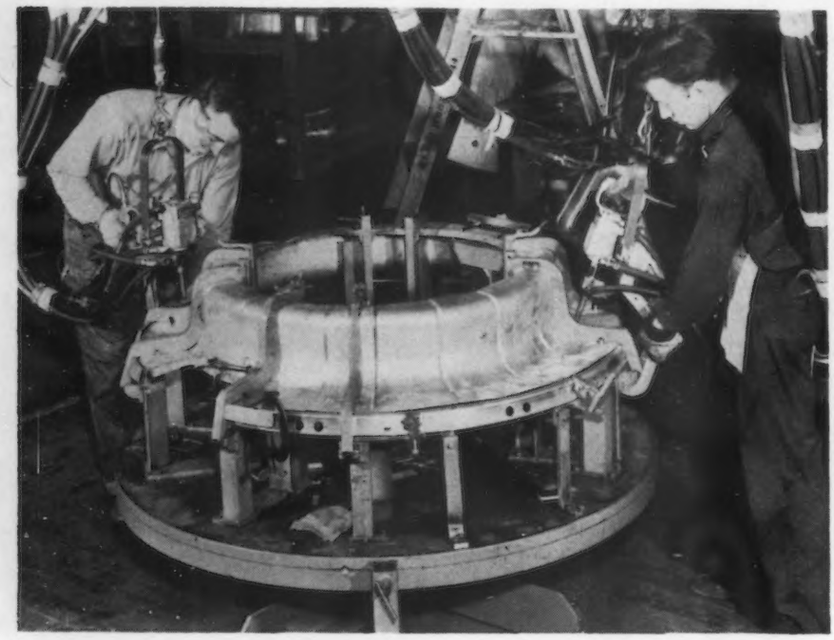
PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD • CONNECTICUT

out this program is the one whose personnel was listed in THE IRON AGE issue of May 28, page 66.

In addition to its industrial salvage program, the ACWP has announced through the Automobile Manufacturers Association that Donald U. Bathrick, sales manager of Pontiac Motor Division, will head a national committee of automobile dealers to collect salvage and scrap materials. Retail outlets and garages will be used as receiving depots and this phase of the industry's scrap drive will be timed to start June 29 when the government's nationwide house-to-house salvage campaign is undertaken. Other industries also are expected to participate in the same way in the national house-to-house drive.



FOR FLYING FORTRESS: Spot welding a Flying Fortress cowling in a Fisher Body plant. These and other parts are being built by Fisher in such quantities that for the first time in aviation history they are being shipped in freight-car-load lots. (Reviewed by U. S. Army Air Force.)

An unfortunate aspect of the launching of the plans in Detroit is that government officials do not yet seem to have found any way to overcome the tongue-in-cheek attitude of newspaper reporters and laymen who remember the aluminum drive fiasco. Laborious attempts at "selling" the scrap drive to a group of newspaper men in Detroit last week met with dull response.

A tip to the government's scrap and salvage campaign directors would be that they should acknowledge that the scrap and salvage industry is a pretty technical proposition and, perhaps, rely on the use of some analogies as outlined in the column on May 28. A local sampling has given evidence that the analogies may be better understood than just arm-waving and speechmaking of the usual type. Inability to put the story across so far here seems to be largely a result of the fact that few of the people connected with the national campaign have yet assimilated enough knowledge of industrial salvage and scrap procedure to be sure of their ground in talking with the press. Trade sources are expressing the wish that this state of affairs be changed.

All Detroit got a lift last week from word out of Cairo that British counter-assaults led by Detroit-made tanks had shattered Germany's main offensive in Libya and had captured or destroyed hundreds of Col. Gen. Erwin Rommel's mechanized forces. Detroit and the nation will get another lift when they find out shortly that another plant in this area now has an assembly line full of tanks-in-the-making. This is one of the plants whose completion of hand-made models was publicized a short while ago, but today the story is that real assembly line volume is an actuality. These tanks are the all-welded M-4 models.

Despite all the advice offered by by-standers, including UAW hecklers, the armored force of the Army appears to be now using at least three different power plant set-ups in the medium tanks. Officers and enlisted men are now attending service schools conducted by Chrysler to familiarize themselves with the newly-designed Chrysler tank power plant which consists of five six-cylinder automobile type engines. This engine is to be installed in the tanks built by Chrysler hereafter. The Ford tank is being equipped with a V-8 engine, younger brother of the 12-cylinder V-type aircraft engine which Ford has been developing. The third power plant in the offing is General Motors Diesel installation which will use two GM oil burning engines side-by-side in Fisher-built tanks.

The Continental-built radial Whirlwind engine which currently is the standard in all medium tanks will be continued in installations made by other tank manufacturers. In fact, for a long time to come it is probable that more radial power plants will be put into tanks than anything else, although each of the automotive groups is going to turn out thousands with their own particular power plant installation.

The important thing at this stage is that there are now two tank plants in production and a third one which may make an announcement of its attainment of the production goal shortly after this appears in print. The volume of tank output that will be attained, probably in July, will certainly shake the Axis.

In the light tank field there is another type of combat vehicle being built by Cadillac which will use Cadillac-built power plants. Here again, mechanics are being trained for the Army for service and maintenance of the new power plant. A group of officers are undergoing such a training program now at Cadillac. This company, incidentally, has made use of a new term in describing the hook-up of automotive engines in various combat vehicles: it calls the power plant and final drive combination a "power train."

"WAYS AND MEANS MUST BE FOUND NOW TO MAKE EVERY MAN AND EACH MACHINE PRODUCE MORE."

-- say WPB spokesmen

2 Big Jobs

#1 HELPING EVERY MAN PRODUCE MORE

Nowhere is this more important than in the tool room. The vast quantity of new tools needed means that the productive capacity of every skilled worker will be taxed to the limit. Tools that crack in hardening or fail prematurely mean precious time *lost* in "doing jobs over". And that time could be used to yield *more* new tools.

To further step up output from each skilled worker, Carpenter has published a 315-page handbook, "Tool Steel Simplified". Over 22,500 copies of this handbook are at work providing useful on-the-job tips to help produce *better* tools *faster*. It answers questions on size change, warping, grinding checks and the relation of design to heat treatment. Whether or not you have an organized training program, "Tool Steel Simplified" can provide practical information for apprentices and a good "refresher course" for skilled workers.

#2 GETTING MORE OUTPUT FROM MACHINES AND PRESSES

Excessive "down time" caused by tool and die troubles can be converted into extra output—with the right tool steel for each job and proper methods of heat treatment. Here are typical reports from plants that have increased machine output by relying on Carpenter's Matched Set Method for help with the proper selection and heat treatment of steel to do each job: "Output up 52,500 pieces per month" . . . "Production capacity of tools up 20% to 100%."

If you would like to know how "down time" can be reduced and output increased, send for "Tool Steel Simplified." It tells how to select the best tool steel for each job, and how to heat treat it for best results. Let this tool room handbook answer many of the questions that come up in your plant. "Tool Steel Simplified" is available at cost to tool steel users in the U. S. A. — $1.00 ($3.50 elsewhere). After you have read it, you will want more men in your plant to have copies.

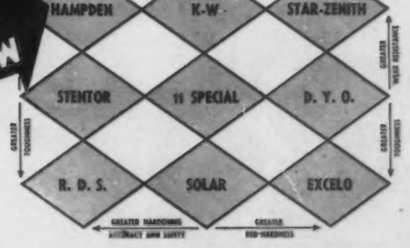
THIS IS THE HANDBOOK that is helping apprentices, tool makers and tool engineers produce more and better tools that will keep machines producing steadily. It is part of Carpenter's program of ALL AID TO TOOL STEEL USERS. *"Tool Steel Simplified" is available at cost to tool steel users in the U. S. A.—$1.00 ($3.50 elsewhere.) Order your copy today.*

THE CARPENTER STEEL COMPANY

Reading, Pennsylvania, Dept. 101

Carpenter MATCHED TOOL STEELS

IMPORTANT BEFORE... VITAL NOW



Washington . . .

• Priorities system has failed as a distributing agent, but new Production Requirements Plan must be made to work for proper assembly of materials for war weapons.

WASHINGTON—During the administration of Martin Van Buren the single entry bookkeeping system established for the Treasury by Alexander Hamilton was still being used to the almost universal derision of business men of the day. Clerks sat at room-long desks, with huge accounting sheets and laboriously penned and computed governmental expenditures the old fashioned way.

A business friend of the Secretary of the Treasury described the elements of double entry system of bookkeeping, and urging its adoption by the government, loaned him a text on the subject. The treasury official promised to give it consideration, and his opinion within a month.

The month passed and the business man called on the cabinet officer to discover that although the Secretary had read the book, he was still unconvinced.

"What," said he, "would prevent a dishonest employee from making intentional compensating errors? Surely, no argument can overcome this possibility."

"No," agreed his friend, "But you certainly must see that no system could be invented which would guarantee the honesty of man. Double entry bookkeeping's main advantage is that it is self-justifying, balancing assets against liabilities, and at the same time is a quick method of ascertaining financial condition. Your single entry system is likewise vulnerable to cheating, but without the factor of self justification."

"Sir," said the Secretary, skewering his visitor with a virtuous eye, "Your argument is very ingenious, but I'll have you know that this is an economical government, and Congress would never consider appropriating money for double the number of clerks!"

THE WPB Production Requirements Plan, mandatory for most metal processors after June 30, is meeting the same short-sighted contentions within and without the government. The questions are being asked: "What's to prevent a manufacturer from falsifying his inventory reports? How will you ever be able to get enough clerks in Washington to allocate on the basis of the production of every American business? How can it work?"

The answer is that it must work. The priorities system has failed as a distributing agent, and will now be used in a modified form to get the different products and essentials of various weapons together at the same time. The iron and steel and other metal working industries must look forward to rationing because preference ratings have become checks which bounce quicker than Lend-Lease can make a loan. It is reported that 85 per cent of all ingots are now rated A-1-a or higher, and that it takes from 8 to 10 weeks to get some A-1-a orders out of the mills. Steelmen in Washington say that it is imperative that something be done to clear the situation. Various weapons are being produced for which essential parts have been held up by one priority failure or another and the civilian economy is suffering correspondingly with like distribution dislocations.

SINCE the government is the principal buyer during war, and officials are trying to prevent the waste consequent to uncoordinated production, the government is determined to make some system work. If it cannot do it by long distance control through the medium of WPB, there are many who will be only too glad to assume more direct control and actually attempt to operate industries. W. L. Batt, WPB Requirements Committee Director, says industrialists should in self interest see to it that it does work.

Therefore, PRP must work. Only metal processing industries whose aggregate metal requirements exceed $5000 in value are going under mandatory control. Primary metal producers, scrap dealers, and warehousemen are going to operate under existing priority procedures for the present. WPB "P" orders for construction, transportation, utilities, petroleum, mining and communications will remain in effect.

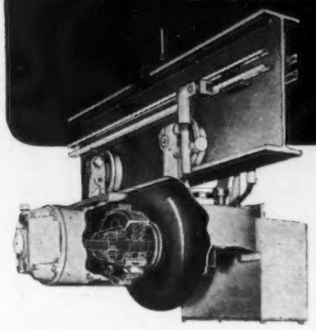
PRP aims to put a quantitative ceiling on the "buying power" of preference ratings geared to demand, and existing capacities of various metal manufacturing industries. When it becomes operative in the iron and steel and other metal producing industries, capacities and use will be measured by the allocation classification, and authorities in the form of a certificate of a rating for all requirements under PRP on pur-

Harris & Ewing Photo

FORGING LINKS ON PRODUCTION: Oliver Lyttelton (right), British minister of supply, began a series of conferences last week with Donald Nelson. His visit probably will lead to establishment of a joint Anglo-American production group, with headquarters in Washington and an office in London.

AMERICAN MONORAIL EQUIPMENT

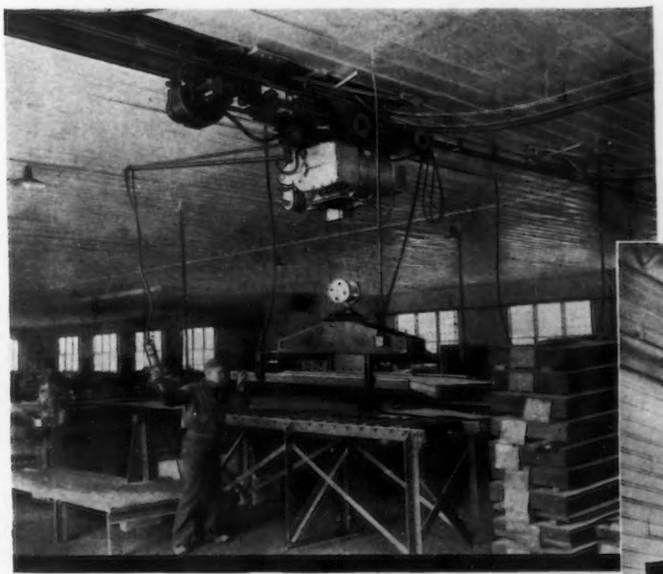
TURNS BACK-BREAKING HANDLING INTO FINGER-TIP HANDLING



Here are photos of two plants that have recently installed American MonoRail Overhead Handling Equipment. In both of these plants, tons of sheet steel are handled as easily as a small boy handles his electric train—with the same finger-tip control. The handling of heavy loads has become practically child's play. These two installations are typical of hundreds of others that have solved their back-breaking jobs with American MonoRail Equipment.

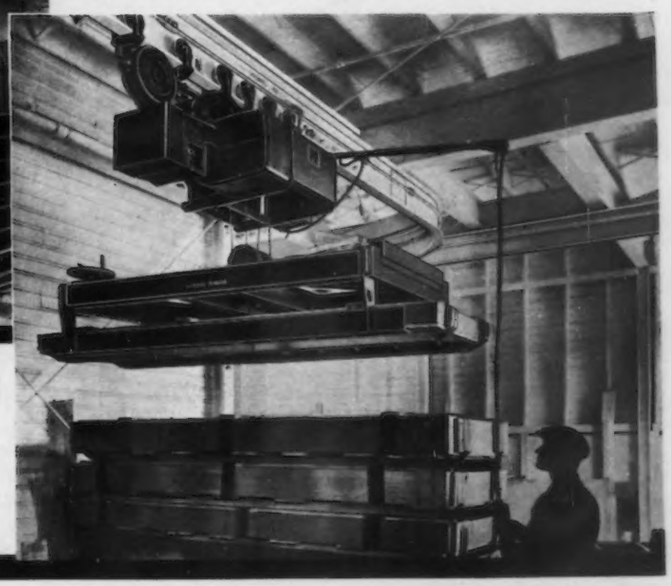
Today, production is handled with unheard of speed and efficiency. American MonoRail Equipment is playing an important part. An American MonoRail Engineer will gladly explain the advantages of this equipment in your plant. This service is without cost or obligation—furthermore, there is no delay or shutdown during installation. Write today.

WRITE FOR Blue Book illustrating hundreds of MonoRail installations.



◀ Push button switch controls Mono-Tractor, hoist and special grab operation.

▼ Five tons of steel travel overhead by finger-tip control.



THE AMERICAN MONORAIL CO.

13103 Athens Avenue Cleveland, Ohio

★ ★ ★

chase orders will be the rationing checks to be used in the future.

PRESENT WPB procedure for the handling of the third quarter metal requirements will involve a sort of a crude rationing of pools of material by the Requirements Committee to the various branches, and the armed services. From these allocations, based on information obtained from Form PD-275, the adaptation of Form PD-25a used in the various metal surveys, and compared with the information on PD-25a, the Industry Branches will process the PRP applications.

The material requirements for each plant will be calculated by WPB, and no more material granted to or taken from a plant than it demonstrates it needs or can produce. A stockpile of materials will be held in reserve, for emergency needs. No PD-1-a applications will be recognized after these industries come under the PRP plan unless for capital equipment. The fact is a producer must use PRP to satisfy all of his material needs. Materials deliveries, subject to moderate restrictions, are to be evenly distributed over each quarter.

Army Plane Tests Insure Substitutes

• • • **Conversion of** airplane design and plant facilities for use of non-strategic materials through cooperation of the Army Air Forces and manufacturers has reached an advanced stage, the War Department announced June 5. In one type of advanced trainer plane low carbon steel is used extensively now.

Emphasis on substitution of plastics, plywood and other materials has been placed particularly on designs for training airplanes, thus insuring maximum amounts of aluminum and other strategic metals for combat planes.

Use of aluminum has been eliminated entirely on one type of training plane. Other designs call for a 565-pound reduction of aluminum and 6 pounds of magnesium per plane. Similar changes are being made on other types of trainers as rapidly as engineering and production programs permit.

Conservation of strategic metals in the construction of Army training planes is summarized briefly as follows:

Advanced Trainers, Two-Engine

To conserve aluminum it was decided early that the greater portion of the two-engine trainers should be of wooden construction. Three types of wooden crew trainers, the AT-10, the AT-13, and the AT-15, are planned for production. These are large aircraft, approximately the size of a medium bomber, and are to be built entirely of wood.

Careful designing has reduced the metal used in the basic airplane structure of the AT-10 to 97 pounds, or 1.6 per cent of the airplane's gross weight. Only 13 per cent of the total gross weight of the trainer, engines and propellers excluded, is of metal. The metal is used on such items as brackets, tail wheel attachment structure, spar attachments, engine nacelle attachment fittings, aileron hinges, wing fittings, and the like.

Flat plywood sheets, which can be produced in volume at factories now available at minimum number of man hours, are used on the fuselage rear section and the wings of the AT-10. The wooden fuel tanks on this airplane are lined with a synthetic material which does not deteriorate through action of fuel.

Advanced Trainers, Single Engine

The AT-6 redesigning program represents a revolutionary development through the replacement of aluminum with low carbon steel. This airplane is scheduled to go into production soon.

The low carbon steel program is the result of more than a year of research. The new materials developed are expected to equal aluminum alloy for strength and safety.

The use of plywood and steel in combination on these trainers will eliminate 75 per cent by weight of aluminum alloy, or approximately 1246 pounds per airplane. The saving of aluminum on 1000 of these airplanes would total approximately 623 tons — enough aluminum to build more than 400 pursuit airplanes.

Basic Trainers

The BT-15 has been redesigned to eliminate aluminum as soon as

THE BULL OF THE WOODS — BY J. R. WILLIAMS

A-HEM! THERE'S A FEW MORE MATTERS HERE THAT NEED YOUR IMMEDIATE ATTENTION--THEY JUST CAME IN AND THEY'RE RUSH!
I DON'T LIKE TO LAUGH AT THE OLD BOY... BUT HE SPENT THIRTY YEARS KEEPIN' US GUYS AT OUR MACHINES, AND NOW TH' GOVERNMENT IS KEEPIN' HIM AT HIS DESK!
HE USED TO WATCH THAT WE DIDN'T SNEAK OFF TO TAKE A SMOKE, BUT NOW HE CAN'T EVEN SNEAK OFF TO TAKE A DRINK OF WATER--THEY BRING IT TO HIM!
J.R.WILLIAMS
HEROES ARE MADE— NOT BORN
6-12
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the change can be made without impeding production. The fuselage, formerly covered with aluminum sheet, now is fabric-covered. The landing gear cowl has been eliminated to save aluminum. The design calls for use of low carbon, low alloy steel as a substitute for aluminum where possible. Studies also have been made by the Army Air Forces and the manufacturer looking toward redesigning of the earlier BT-13 from aluminum to steel or wood, or both.

The total aluminum and aluminum alloy eliminated under the substitution program for the BT-13 and BT-15 amount to 565 pounds per airplane. In addition, a total of more than 6 pounds of magnesium per plane would be eliminated.

Primary Trainers

The only all-metal training airplane constructed of aluminum was the PT-22. Production of this model has been stopped and the plant converted to subcontracting.

The PT-19, which has been constructed largely of wood and tubular steel, with a small quantity of aluminum in the engine cowling and flaps, has been redesigned to eliminate aluminum from the flaps and the use of wood in its place.

The PT-17 is constructed of tubular steel, wood and fabric, the wings being of wood and the fuselage of tubular steel construction, fabric-covered.

The PT-21, although it utilizes aluminum in a semi-monocoque fuselage has wood, fabric-covered wings.

WPB Shifts Priority Heads

Washington

• • • **W. G. W. Glos,** former head priority specialist in the WPB production division, has been given a similar job in the WPB division of Industry Operations. His assistant, Walter C. Armstrong, has taken over the job of head priority specialist in the production division.

J. W. Peters, former head priorities specialist in the Materials and Purchases divisions has been appointed to the Bureau of Priorities technical consultant staff.

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Step Holes—Several Diameters
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Parts Too Heavy to Be Brought to the Gage
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Bores Too Small to Be Checked Otherwise
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Highly Finished Bores Vulnerable to Scratching

The Sheffield Precisionaire is extremely fast in action, has the highest degree of accuracy in both process and final inspection—may be used either as a limit comparator for checking tolerance or as an indicating gage for classification of parts. It gives an accurate check not only of internal diameter, but bell mouth, out-of-round and average diameter.

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THE SHEFFIELD CORPORATION
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Gage Division · DAYTON, OHIO, U.S.A.

SHEFFIELD MASTER GAGEMAKERS

WEST COAST . . .

• Railroads doing a marvelous job moving tonnages to the Pacific Coast . . . Only occasional delays have occurred recently . . . Load may be increased if more prefabrication of ships is done.

SAN FRANCISCO—No shortage of cars or important delays in all-rail transportation of steel to the Pacific Coast have occurred yet despite the tremendous tonnages being moved West.

The railroads have weathered dire predictions that they would constitute a bottleneck restricting manufacturing operations and throw the rest of the Coast economy on its own resources. Now, increasing signs that prefabrication will be done on a larger scale in the mountain and inter-mountain states indicate that the carriers are willing to take on a still greater load.

Several months ago the time required for delivery of steel to the Coast from Eastern mills was arbitrarily lengthened one day, a direct result of the great increase in this type of traffic, but since that time only occasional delays have occurred. These have been incidental, rather than the general rule.

Casual inquiry and observation shows no great backing up of cars at Coastal ports or factory destinations, despite the fact that transpacific water traffic has a concentrated origin in fewer ports than prior to the war.

THE load on the transcontinental carriers will be heavier, however, if an increased amount of prefabrication for ships built on the Pacific Coast is done in the heretofore non-industrial states neighboring the Great Divide. For some time, a group of Denver metal fabricators has been handling this type of work successfully. Now, a pool in Southern Idaho, is being formed primarily to bid on metal fabrication for Maritime Commission ships. This cannot be regarded as just another small-town protegé of the WPB Contract Distribution Branch, for it is headed by Morrison-Knudsen Co., one of the West's largest contractors. Morrison-Knudsen was one of the original Six Companies, closely associated with the Kaiser group both in dam building activities and subsequently participating in some of the largest military contracts ever awarded in the Pacific Basin. No direct tie-up with the Kaiser shipbuilding group is indicated in the organization papers of the Idaho pool, but a policy of spreading the work over a wide area, to avoid congestion at the point of assembly, might well have as a logical sequence prefabrication several hundred miles from shipbuilding centers.

From a fabricating standpoint, such a site is good because of the fabrication in transit rate which allows the fabricated unit to be delivered to the Coast as cheaply as if the steel were fabricated at its final destination. In normal times, Pacific Coast fabricators wail loudly about fabrication in transit rate provisions which allow Midwestern fabricators to compete on an advantageous basis as close as 300 miles from the Pacific Coast. Now, with all Coast shops full, no complaints are heard. Two criticisms of large scale fabrication in the Rocky Mountain region have been voiced by individuals not connected with the steel industry. One complaint is that partially fabricated material will bulk larger and thus require more cars for movement to the Coast than plain steel. Subsidiary to this criticism is the academic plea that unloading and loading at a point of fabrication en route is uneconomic of manpower.

The second criticism is that if fabrication or manufacturing operations develop on a very large scale in this industrial no-man's-land—and they are developing very rapidly—labor which has migrated to the Coast from this region will return home with consequent dislocation in Coast industry. Already, the Joads, whose Grapes of Wrath produced a very heady financial champagne when regular employment was offered in the aircraft and shipbuilding industries, are now returning home in large numbers. California reports dwindling immigration, and growing exodus. Less overtime pay is provided as the Coast plants become better established, and the dustbowlers are going home to work in plants established in the Midwest. Establishment of plants in the Rocky Mountain states on a large scale, some believe, might add to this problem, unless job freezing quickly is made effective.

ANOTHER school of thought believes that a sufficient labor supply for the Rocky Mountain plants can be drawn from the immediate locality. This reasoning holds that there are still large numbers of farm and marginal workers in that territory, who have been unable to make their way to the Coast either for financial reasons or because of family ties, who would be only too glad to work in plants close to home. So far, this has been true. No plant expansion in the area within the foreseeable future has such large labor requirements that a serious dislocation is threatened.

Thousands of workers pouring into small Pacific Coast towns like Vancouver, Wash., and even some of the larger ones, now make housing a major problem to be considered in opening up a new enterprise or expanding an established one. Housing may become the major bottleneck. Consequently, any program which keeps workers close to their present homes is looked upon with favor.

Current enigmas in the plant expansion program are statements originating with Congressmen that large metal plants, in addition to those now under construction, will be built on the Coast. Almost exactly coincident with the freezing of construction on one major Pacific Coast steel expansion, and the flashing of the yellow light to another, a representative of the naval appropriations sub-committee of the House of Representatives was touring the Coast, and issuing statements to the effect that large new steel plants would be built

On the Alert

TO SERVE YOU. Under present conditions, one of the most important services a clutch manufacturer can offer industry is a competent and adequate parts and service organization to assure uninterrupted production, prevent costly delays in waiting for factory shipments of needed parts.

That's why the Twin Disc Clutch Company maintains seven strategically-located, factory-controlled branches and 30 parts and service stations, each with ample stocks of parts. Skilled service men are on call 24 hours a day, constantly "on the alert" to serve you . . . to prevent time-consuming delays due to accident or any other cause.

When in need of parts or service, call your nearest Twin Disc representative.

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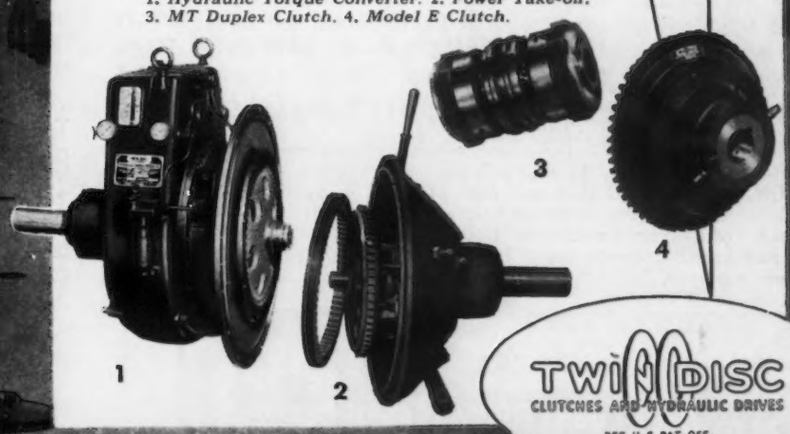

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TWIN DISC CLUTCH COMPANY, 1370 RACINE STREET, RACINE, WISCONSIN

here. He even went so far as to tell reporters that he had inspected several ore deposits. A Congressman from the state of Washington has announced that the War Production Board will send representatives soon to "determine the best locations for several aluminum plants originally slated for construction in the East. The plants will probably be located east of the Cascade Mountains in proximity to the Coulee-Bonneville power lines". It is safe to predict that, on the Coast, investigation following the industrial construction freeze order will show no unbalanced expansion of facilities for the production of basic materials. If any comprehensive survey is made, it may be a surprise to some people how much unutilized productive capacity exists in aircraft parts plants, and the extent of unutilized covered floor space in plants which have not been converted to war production.

ALTHOUGH shipyard wage rates were equalized on a nationwide basis at the Chicago conference sponsored by the Shipbuilding Stabilization Committee, and ship repair wage rates were set at a later conference on the Coast, no action is in prospect until late in July on the matter of whether the yards shall work two ten-hour shifts or three eight-hour shifts each day. Speaking at a labor conference sponsored by the University of California, Wendell Lund, director of the WPB Labor Production Division, stated that nationally the rate of labor turnover in the shipyards has been reduced from an average of 25 per cent a year during the last war to only 4 per cent during this war. His statement that labor "pirating" has become practically non-existent in American shipyards does not hold water insofar as the San Francisco Bay region is concerned, and one of the major factors in enabling this continuance is this question of length of shifts.

Nationwide wage stabilization in the aircraft industry, similar to that established for the shipyards by the Shipbuilding Stabilization Committee, was requested of the War Labor Board last week by CIO United Automobile Workers locals at Ryan, North American, and Vultee plants in Southern California. This move is part of the strategy to attempt to bring southern California wage levels up to those of plane plants in Michigan automotive centers. Whether or not serious attention is given to nationwide stabilization, some sort of industry-wide agreement in southern California now apears quite possible. The question of wages is tossed squarely in the lap of the War Labor Board in the new contract signed between the UAW and Vultee which is to last for the duration plus 90 days, or for one year, whichever is longer. Both the Company and the union unite in asking the War Labor Board to set the wage scale, agreeing to abide by their ruling. The decision in this case may well prove to be the model to be followed in settling wage demands at Lockheed-Vega, Douglas, North American, and finally, as contracts expire, all other companies in the area. If the War Labor Board refuses to increase present Vultee wage scales, it will put a damper on efforts to bring aircraft wages here in line with those in the East, and up to the level paid by the shipyards.

SLOGANS FOR MACHINES: Red and blue stickers in varied designs are now available for machine shops to help step up production. They may be obtained from War Production Drive headquarters in sets of 360 stickers, packaged. Orders should be placed through production drive committees in plants.

Temperature Room Is Feature of New Gage Plant

• • • **The new** Detroit plant of the Jansson Gage Co. is scheduled to open June 15. Ground for the 3500 ft. building at 19208 Glendale Avenue was broken early in April. W. C. Johnson is the contractor.

When completed, the plant will be devoted exclusively to the manufacture of precision block and thread gages for use in war production. An important feature of the new building is an improved temperature room, where a temperature of 68 deg. is mantained. Final lapping operations on Jansson gage blocks are performed in this room to insure rigid measurement control within the specified limits.

Included in the new equipment being installed is an Ex-Cell-O Thread Grinding Machine to give the extreme accuracy and high finish required for precision thread gages.

Officers of the Jansson Gage Co. are: Harold Norberg, president; A. A. Jansson, first vice-president; R. M. Wright, second vice-president, and A. F. Pearson, secretary-treasurer.

STRIKING POWER!

Arcos Stainless Electrodes are hard hitting offensive weapons in the hands of our nation's welders. You can be sure—it's Arcos.

ARCOS CORPORATION
401 N. Broad St., Phila., Pa.

it's ARCOS for stainless electrodes

"QUALITY WELD METAL EASILY DEPOSITED"

Distributors Warehouse Stocks in the Following Cities:

BUFFALO, N. Y.	*Root, Neal & Co.*
BORGER, TEXAS	*Hart Industrial Supply Co.*
BOSTON, MASS. (Belmont)	*H. Boker & Co., Inc.; W. E. Fluke*
CHICAGO, ILL.	*Machinery & Welder Corp.*
CINCINNATI, OHIO	*Williams & Co., Inc.*
CLEVELAND, OHIO	*Williams & Co., Inc.*
COLUMBUS, OHIO	*Williams & Co., Inc.*
DETROIT, MICHIGAN	*C. E. Phillips & Co., Inc.*
ERIE, PENNA.	*Boyd Welding Co.*
FT. WAYNE, IND.	*Wayne Welding Supply Co., Inc.*
HONOLULU, HAWAII	*Hawaiian Gas Products, Ltd.*
HOUSTON, TEXAS	*Champion Rivet Co. of Texas*
KANSAS CITY, MO.	*Welders Supply & Repair Co.*
KINGSPORT, TENN.	*Slip-Not Belting Corp.*
LOS ANGELES, CALIF.	*Ducommun Metals & Supply Co.*
MILWAUKEE, WIS.	*Machinery & Welder Corp.*
MOLINE, ILL.	*Machinery & Welder Corp.*
NEW YORK, N. Y.	*H. Boker & Co., Inc.*
OKLAHOMA CITY, OKLA.	*Hart Industrial Supply Co.*
PAMPA, TEXAS	*Hart Industrial Supply Co.*
PITTSBURGH, PA.	*Williams & Co., Inc.*
PORTLAND, OREGON	*Industrial Specialties Co.*
ROCHESTER, N. Y.	*Welding Supply Co.*
SAN FRANCISCO, CALIF.	*Ducommun Metals & Supply Co.*
SEATTLE, WASH.	*H. A. Cheever Co.*
ST. LOUIS, MO.	*Machinery & Welder Corp.*
SYRACUSE, N. Y.	*Welding Supply Co.*
TOLEDO, OHIO	*Williams & Co., Inc.*

Fatigue Cracks BY A. H. DIX

"E's" with Slight Unease

• • • "Deac" telephoned breathlessly that an idea for an article just struck him. "Why don't you," he said, "tell manufacturers who are in line for a Navy 'E' how to conduct the ceremony? Give 'em a short course in Navy etiquette, how to tell a lt. com. from a lt. jg., why calling a ship a boat acts as an emetic to a Navy man, why the flag with the 'E' is a burgee and never a flag, when to break out the champagne, and so on."

We promised to put it up to the brains department, and we did, but couldn't warm that department's interest even to room temperature. The editors' point is that as getting a Navy "E" is usually a once-in-a-lifetime experience, like marriage, a slight embarrassment and a certain amount of awkwardness are becoming.

They think it would be a mistake to standardize the ceremony and have it run off as smoothly as say the quadrennial meeting to decide who will be the Democratic candidate for mayor of Jersey City. The presence of some rough edges, they aver, adds to the occasion's charm. They even advocate that the Navy men making the presentation feign a modicum of pretty confusion, in order to create the impression that, so rarely is the honor conferred, the ceremony has not had an opportunity to jell.

Sorry, Deac. Lord knows we tried.

Horrors of War

• • • The Lehigh Safety Shoe for women as described in your New Equipment Section may be the solution to a war problem outside industry. My daughter, a volunteer hostess at the local service men's headquarters, must dance with all comers as part of her duties. She thinks the hard shoe toes would ease the load on her toes.

—*R. A S., Indianapolis.*

We put it up to our Washington Bureau, which teletypes in reply:

WAR DEPARTMENT OKAYS STEEL TOES FOR HOSTESSES DOING RUMBAS, FOXTROTS AND OTHER CLOSE-TO-FLOOR MANEUVERS. BUT FORBIDDEN AS DANGEROUS TO ARMED FORCES IN CONGA AND OTHER KNEECAP MENACES.

Writ Sarcastic

• • • On page 94 of your May 28 issue you speak of "the difficulty of administrating affairs so distant." What is this administrating? Is it anything like administering?

A. W. M.

As alike as Vienna roast and hash. *Administrate* and *administer* are synonymous, as A.W.M. should have found out from his dictionary, before tangling with our brains department which will spot him a half dozen antonyms and synonyms and take him on any time.

No Priorities in Ivory Towers

• • • The thunder of such economic earthquakes as wars, depressions and booms are muffled by academic air. Even the most aurally acute of our seats of learning seem to hear the echoes only faintly, as through an acoustically treated Chinese wall.

Of course, there are exceptions, but among them is not the physical laboratory of an Ivy Leaguer that just wrote an AA priority equipment manufacturer:

"Please send us your catalogue, cost of your product, and approximate delivery date."

Die Is Cast—In Concrete

• • • Willow Run's dies—great, solid, steel things, firmly imbedded into concrete foundations . . .

—*New York Times*

Get out the pneumatic hammers, boys, we're going to change a die.

Company Provides Floor Space

• • • Freddy Alger, 20, who works in the apprentice school (of the Thompson Products Co.), averages $180 a month, part of which goes into the necessary purchase of machine tools.

—*New York Times*

Come up some time and bring your multaumatic.

Scrap Shortage Cure

• • • During the Napoleonic wars, when the State of Prussia ran short of gold, married women were asked to turn in their gold wedding rings. In return each received an iron ring with the inscription "I gave gold for iron."

In view of the shortage of metal scrap, couldn't this be worked today in reverse?

—*George Appel*

Why not, if the WPB's scrap experts will just take the time to work out a few of the details? We're sending it along to Washington, attaching a rider of our own, of which we are proud.

Our idea is this: in our youth every child was a scrap collector, combing alleys, fields, streets and city dumps for every last bit of metal and rubber scrap. Unlike their elders, children are powerfully moved by the profit motive, and the ten or twenty cents received for the weekly hoard was important money.

This reclamation process was halted, or at least hindered, by the enactment of two kinds of municipal ordinances. Some towns forbid the buying of scrap from children under eighteen years of age. Others deny the use of their streets to itinerant buyers of scrap.

These ordinances, it seems to us, are luxuries that we cannot afford in wartime. Periodic patriotic scrap drives will help, but they work only spasmodically, and we are all for restoring the scrap dragnet, operated by children and sparked by economic incentive.

Our enthusiasm for this idea is equalled only by our ignorance of the scrap business, and we would be dismayed no end if Ed Barringer, head of the Institute of Scrap Iron and Steel, produced figures showing that children's contribution to country scrap totals was never more than piddling and that the cost of collection exceeded its value.

Discomfort by Edict

NO RELAXATION ON METAL FURNITURE, SAYS ADAMS

—*Headline in* THE IRON AGE

The hell there isn't.

Long Pull

• • • We thought it would warm your heart to learn that Iron Age advertising pulls for 2½ years. The attached coupon, received last week, was clipped from our ad appearing in your Jan. 18, 1940, issue.

—*R. S. Aitchison, Lindberg Engineering Co.*

We are grateful for this contribution to our longevity dossier, which offers mounting evidence of our niggardliness in estimating the useful life of copies of your favorite family journal at only one year. Once a reader sent us a clipping of a pump ad, with a notation, "Where can I get a part for this pump?" We found the ad had appeared a half century earlier, which seemed to us to be overdoing it somewhat.

Puzzles

• • • Last week's monkey dangled on a 5-ft. rope.

Lt. Com. A. R. Simpson sends this in:

Three pastures are covered with grass of equal density, that grows at an even and constant rate. The first pasture has an area of 24 acres, the second an area of 75 acres, and the third 180 acres.

If the first pasture can feed 12 cows for 3 weeks, and the second can feed 25 cows for 5 weeks, how many weeks can 30 cows feed full fare on the third pasture, provided that every cow eats the same amount each week, and the same amount weekly as every other cow?

America Fights the Clock with These Scales!

PRECIOUS minutes can be saved with modern Fairbanks-Morse Scales.

This scale, installed in a conveyor system, is weighing castings on the move. At the touch of a button castings are weighed without stopping and a printed record is made!

Use your priority to secure Fairbanks-Morse Scales that will not only save time *now,* but in years to come. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

FAIRBANKS-MORSE

SCALES
DIESELS
MOTORS
PUMPS

Dear Editor:

NEW EMPLOYEE INSTRUCTION BOOK

Sir:

We are compiling a booklet to be distributed to new employees coming into our organization and we would be very much interested in seeing what other companies have done in this same connection.

Perhaps you can advise us where we may be able to obtain copies of similar booklets issued by other companies which we should like to have for reference purposes only.

H. A. BROGAN,
Vice-President,
Republic Drill & Tool Co., Chicago

• Among the companies that have a booklet for new employees are: Revere Copper & Brass Co., 230 Park Avenue, New York; Servel, Inc., Evansville, Ind.; Peoples Gas, Light & Coke Co., Chicago; American Cast Iron Pipe Co., Chicago; Cleveland Twist Drill Co., 1260 E. 49th Street, Cleveland; Crane Co., 79 E. 9th Street, Chicago; Fairbanks, Morse & Co., Beloit, Wisconsin; Gates Rubber Co., 999 So. Broadway, Denver; Union Steel Products Co., 242 N. Berrien Street, Albion, Mich.; Waukesha Motor Co., 1939 Schulze Blvd., Waukesha, Wis.—Ed.

PRIORITIES

Sir:

We just recently experienced a very severe flood and included with the property damaged was a copy of the priorities guide.

Will you please forward a new copy to us just as soon as possible.

J. R. GAINFORT,
Office Manager,
McClave Co., Allentown, Pa.

Sir:

We will appreciate your listing our name on your mailing list to send us copies of your next revision of the priorities guide. It has proven to be invaluable to us.

L. D. ACHESON,
Lamson & Sessions Co., Cleveland

Sir:

The supplement dated March 28, 1942, to THE IRON AGE, and entitled "Priorities Section" 5th Edition, has proved very valuable to us in our various Government offices.

If a later edition of this supplement has been issued I would greatly appreciate receiving 15 copies.

S. D. PIERCE,
Canadian Munitions Department, Washington

PLATING

Sir:

We have read in the Nickel Bulletin of March 1942 a review of an excellent paper on Specification Plating by Mr. C. B. F. Young. This article would be of great practical value to us and we are wondering whether you could send us a copy.

DAVID MOSS,
Robinson Waxed Paper Co., Ltd., Fishponds, Bristol, England

GERMAN STEELS

Sir:

I noted your remarks on page 78 of the issue of May 28 dealing with the various German types of steel. I wonder whether the attached book is of value to you?

It does not, unfortunately, give the required figures as to the D. I. N. specifications, but might perhaps furnish you with some other valuable information.

You may use the book at your convenience and consider this to be a small contribution on my part to the war effort.

W. G. STONE

• Thank you, Reader Stone—Ed.

LEAKY CASTINGS

Sir:

I would be pleased to receive any information you may have relative to salvage of cast iron castings due to porosity. We have at times small seepage leaks in some of our larger castings, both cast iron and aluminum, and both from water and oil passages. Since such leaks are frequently not detected until after final machining, they become scrap unless suitable means of stopping the leaks are found.

Under normal conditions these castings, sometimes cylinder blocks, are scrapped. Under existing emergency conditions any feasible means of salvaging should be resorted to. However, the old "rusting in" method, such as sal ammoniac solutions are not acceptable since inhibitors used in our oils remove the rust from the pores.

R. H. TERRY,
Chief Metallurgist

• See "Reclaiming Porous Castings," page 64, April 2, 1942 issue of THE IRON AGE.—Ed.

PRICE GUIDE

Sir:

We are enclosing 25c., and would appreciate your mailing us one of your price guides.

In this week's issue our good friend, Mr. Van Deventer, has an editorial "Incentives for Production." This is certainly very good, and if we can trouble you to wreck your office copies to send us two more of these, we would appreciate it.

O. G. KNAPP,
Clark Bros. Bolt Co., Milldale, Conn.

HISTORY REPEATS

Sir:

Will you kindly send us six copies of the editorial "History Repeats"? Please mark for the attention of the writer.

N. A. MUNNING,
Hanson-Van Winkle Munning Co., Matawan, N. J.

SAWDUST CONCRETE

Sir:

With reference to the article and picture on "Concrete Substitutes" on page 122 of the May 7, 1942 issue.

The so-called substitute concrete evidently is a light-weight concrete employing sawdust as aggregate. The enclosed pamphlet contains brief descriptions of lightweight-aggregate concretes developed and used in this country since the First World War. They are used widely in the manufacture of precast building units and have more durable properties than the sawdust concretes which have an avid affinity for moisture.

FORREST T. MOYER,
Bureau of Mines, University, Ala.

NO ALUMINUM, NO NICKEL

Sir:

We are confronted with the problem of finding some method of preventing the cast iron handles and cranks which we are using on our seal presses from rusting.

Originally these seal presses were made entirely of aluminum. After the aluminum supply was cut off, we substituted cast iron and nickel plated the handles. Now, however, the pickling solution used for nickel plating has been frozen by the government and we are unable to nickel plate our castings.

Kindly send us any information you have on how to treat the cast iron handles to prevent rusting.

FRED W. SOMMERFELD

• Why not a good grade of lacquer baked at low temperature? Or, in the absence of a baking furnace, try an ordinary air-drying lacquer, some of which have fairly good corrosion-resisting properties. Or you may wish to rustproof before painting. If you want to be real fancy, you could silver plate the handles, silver being one of the few metals that are still plentiful. —Ed.

AIR FREIGHT

Sir:

We would appreciate receiving for our Engineering Library files, two copies of your article, "Freight Takes To The Air." This article appeared in the Feb. 26 issue.

F. W. DEVLIN,
Consolidated Aircraft Corp.

UNDER PRESSURE

The pressure is on! American Industry's turn to the business of producing the materials of war, now moving into full speed, has put men and machines alike under the utmost strain. Nor is the pressure to be lessened until our enemies have been literally drowned in the vast flood of our production.

As designers and producers of pressed steel stampings, Transue was early called on to devote its entire facilities to the war production program. Of course, during the ensuing months, every effort has been directed towards increasing, more and more, the extent and effectiveness of its contribution. Operating thus in the present emergency, this pressure has seemed to Transue essentially more than a stimulus to industrial achievement on today's vital job—additionally, it is a force which will motivate an economy of more things for more people in the peacetime tomorrow.

TRANSUE & WILLIAMS

ALLIANCE • OHIO

DESIGNERS AND MAKERS OF DEEP DRAWN STAMPINGS

SALES OFFICES: NEW YORK, PHILADELPHIA, CHICAGO, DETROIT, INDIANAPOLIS, CLEVELAND

This Industrial Week . . .

STEEL plate production in the United States finally has topped the million-ton mark for a single month, an accomplishment which is well worth recording in view of the great demand for ship plates and the rising total of ship sinkings off the East Coast. May plate shipments totaled 1,012,194 tons and deliveries to shipyards in that month for the Maritime Commission exceeded 300,000 tons, representing distinct progress in efforts to close the gap between ship losses and new ship construction. These are statistics vital to all Americans.

425,211 Tons from Strip Mills

Plate production from continuous strip mills, which in peacetime rolled vast quantities of steel for automobiles, contributed heavily to May plate output, the volume from such mills rising to 425,211 tons compared with 337,519 tons in April. Further conversions of strip mills under way will help push plate production to well above the million-ton mark. This unprecedented output of plates has been made to some extent at the expense of sheet mill tonnage. Sheet tonnage on some strip mill order books continues to increase, a result of priorities, although it cannot possibly be produced. This situation seems to call for War Production Board action in reallocating such orders. Already some highly rated sheet business is frozen because of plate demand while sheet bookings of less urgency are being rolled elsewhere.

Various problems have arisen because of the necessary emphasis on steel plate production. One concerns labor supply. A Midwest mill recently was forced to shut down its sheet finishing department for three consecutive weeks, while another plant operated at half capacity, creating a problem of keeping available the men thrown out of work by the pressures of war.

The possibility of a shortage of steel workers later this year and early in 1943 is a headache which some plant managers do not face with composure. Operating staffs have already been hit by the draft although several large companies have established a policy of not asking for a deferment for any employee. Plant expansion programs to be completed in the steel industry late this year will require skilled hands which may have gone to the armed services or have drifted from mills temporarily down, such as some sheet departments, to other lines of defense work. Since the basic war industry is steel, a new government study of actual and prospective losses of steel employees to the Army might help the war effort. Already scrap firms are complaining that scrap yard forces have been hard hit by the draft.

Cross-Hauling A Problem

Among the problems which are preventing undue cheer in industry over the somewhat brighter war picture is the growing amount of cross-hauling forced by allocations for war orders. Plates from the East Coast are being shipped to the Midwest and other shipments of plates are going from the Midwest to shipyards in the East. Thus plates, of which there is still a shortage, are being cross-hauled in freight cars, of which there is expected to be a great shortage. Some of this cross-hauling, which can be applied to other items than plates, is unavoidable.

Distress Stock On the Market

An increasingly large amount of distress inventories is being placed upon the market by companies formerly making non-essential products. Most of these concerns are attempting to market their stocks at the price paid for them, plus freight, but it is feared that some of this semi-processed steel will not be marketable. Meanwhile, it is reported that the Government may eventually take over all such "frozen" inventories at their purchase prices with funds obtained from the Metals Reserve Corp. When this is done, the steel may be listed in an orderly fashion and be stored in Government warehouses. The Government has already established one warehouse in upstate New York to service New England war plants. In some quarters there is speculation that the Government may soon license warehouses. At present, warehouses are being advised of distress steel stocks held by private concerns, such as Ford Motor Co., and the warehouses have been able to absorb considerable tonnages of such steel.

Through cooperation with the concrete bar industry, the Government has been able to build up sizeable stocks of concrete bars at strategic points for the use of armed forces when and where necessary. This action permits prompt delivery in emergency cases. Concrete bar backlogs have been reduced in the past few weeks

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pittsburgh	Chicago	Valley	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
Week of June 6	99.0	104.5	98.0*	85.0	94.5*	104.5	83.0	98.0	97.5	105.0	97.0	111.0	105.0	98.0
Week of June 13	99.0	104.0	99.0	90.0	97.5	104.5	83.0	98.0	105.0	105.0	102.0	108.0	115.0	99.0

* Revised

due to a decline in new business. Unplaced tonnage is off about one-quarter, leaving approximately 130,000 tons to be placed.

By the middle of June, practically all steel companies are obligated to furnish the WPB with a detailed analysis covering backlogs and shipments classified as to products and priority rating levels. This information can be used to determine the extent to which each company is working on allocations and high priority rated business. Such a report could possibly be the basis for redistribution of steel orders or a change in some allocation practices of the WPG. While similar data has been requested from time to time, this is the first attempt by the War Production Board to blanket this industry with such a request.

Priority News Comes Fast

For another week priority developments have come thick and fast, with the emphasis being placed on the Production Requirements Plan. (See the new IRON AGE Priorities Guide, sixth edition, for details.) This plan, which thousands of metal working companies are studying, centers around the fabricators and processors of metal, and will include their incidental requirements as well as their metal needs. When such requirements for other materials are not incidental, but dominant, the metals requirements will be apportioned to fit the other requirements. (Consumers of less than $5,000 worth of metal will be left to operate under existing procedures.)

Effective June 30, the Production Requirements Plan represents a brave new step in this war to facilitate distribution of scarce materials and machinery. In some cases production of parts for war implements have been held up by a priority failure. Likewise the civilian economy is considered by many to be suffering from ineffective distribution of materials. Other supporters of the PRP as a solution to priority problems see it as a barrier to the aims of some "Washington workmen" who would like to take direct control over U. S. plants.

This week Maj. Gen. Levin H. Campbell, the new Army chief of ordnance, announced the organization of eight groups of trouble shooters in the ordnance plants. These groups, headed by industrialists, are serving as the means of exchange of information, parts, raw materials. Industries already covered are manufacturers of such items as mechanical time fuses, carbines, 37-mm. tank and anti-tank guns, steel cartridge cases, and 0.45-cal. pistols. Raw materials and key parts are quickly shifted from one plant to another under a plan permitting the quickest use of supplies.

L. W. Moffett, Washington correspondent of THE IRON AGE, *writes that priority ratings have become checks which bounce quicker than lend-lease can make a loan.* *Turn to page 80.*

Another development of the week is the announcement that a program of instructions for blacking out steel plants in air raids has been approved by the War Department. The instructions cover operations in coke plants, blast furnaces, bessemer converters, open-hearth furnaces and mills. So far the blackout regulations, based in part on a study of experience of English plants during raids are not compulsory. Similar studies are being made for the gas and oil industries where blackout problems likewise are difficult.

Interest in the new National Emergency steel is growing rapidly, and manufacturers have started substantial production of this new steel to meet increasing orders from customers who have been having considerable difficulty getting the old nickel alloy steels. One company has made more than 28 heats of the new NE steels. While many customers accepted the new steels without complaint, THE IRON AGE is told that in one exceptional case a consumer was able to prove to WPB that the substitute alloys probably would not meet the severe stress that would be placed upon them in his important item of manufacture.

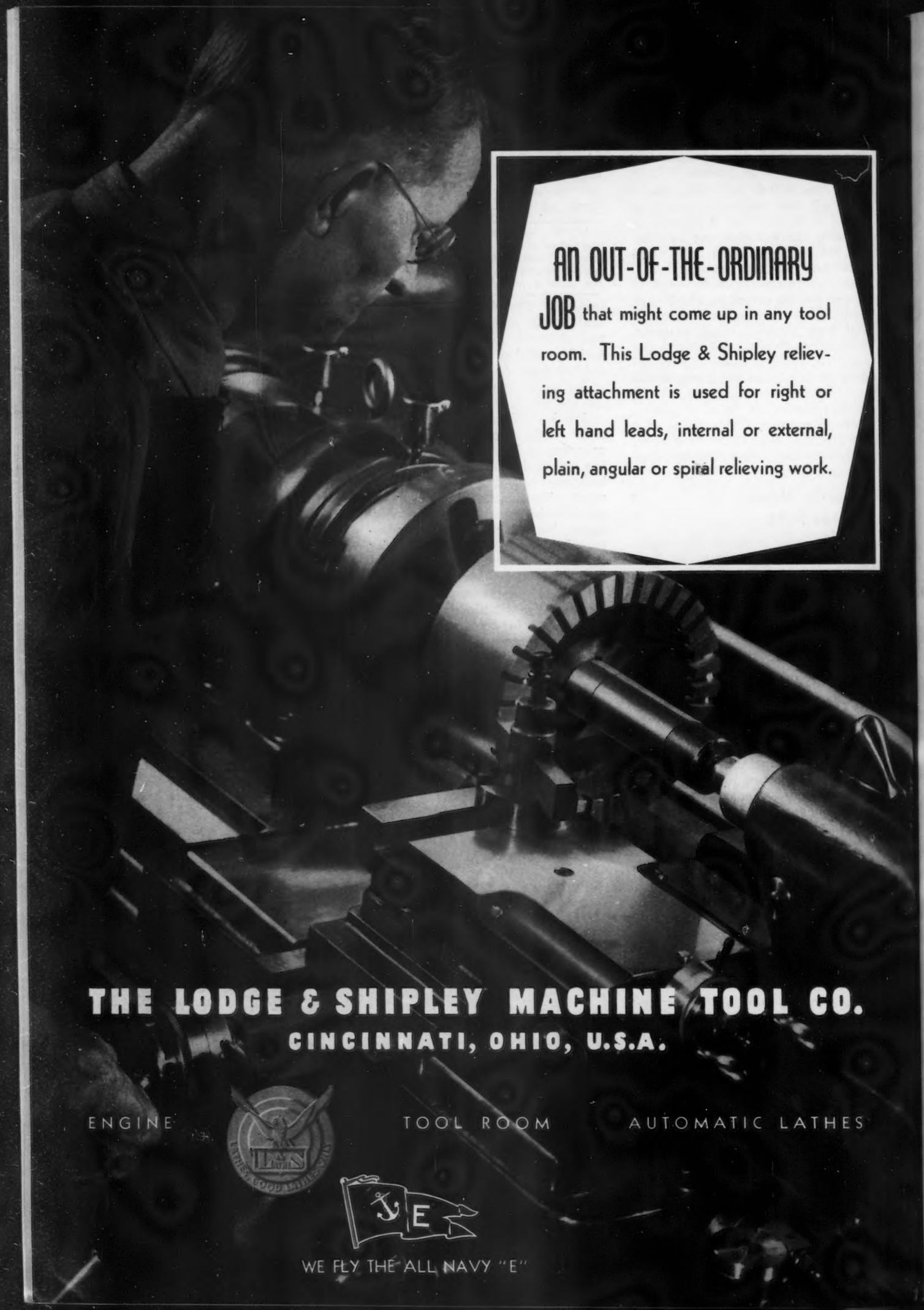
WPB allowed this customer to get his special nickel alloy steel.

Meanwhile steel ingot output this week rose a point to 99 per cent, from 98 per cent last week, the advance being made possible by sufficient pig iron and scrap. Eastern Pennsylvania plants, up 5 points to 90 per cent, have fully recovered from effects of the flash flood of a few weeks ago. A strike early in the week was interfering with production at the John A. Roebling's Sons Co.'s plant in New Jersey.

Wheeling Rate Unchanged

Pittsburgh district steel operations remained unchanged at 99 per cent, as do operations at Buffalo, of 104.5 per cent; Wheeling, 83 per cent; the South, 98 per cent, and the Southern Ohio river area, 105 per cent. Districts reporting increases are Youngstown, up a point to a revised rate of 98 per cent; Cleveland, 3 points from a revised rate of 94.5 per cent; Detroit, 7½ points to 105 per cent; the Western area, 5 points to 102 per cent, and the Eastern rate, 10 points to 115 per cent of capacity. Chicago is down a half point to 104 per cent and St. Louis is 3 points lower at 108 per cent.

SCROLL CASE SECTIONS: Awaiting their turn for placement in the Shasta power plant, these sections, when installed, somewhat resemble the shell of a snail laid on its side. The function of a scroll case is to insure that water enters the turbine runner or wheel at every point on its circumference. When finally installed the scroll case is embedded in concrete.


AN OUT-OF-THE-ORDINARY
JOB that might come up in any tool room. This Lodge & Shipley relieving attachment is used for right or left hand leads, internal or external, plain, angular or spiral relieving work.
THE LODGE & SHIPLEY MACHINE TOOL CO.
CINCINNATI, OHIO, U.S.A.
ENGINE
TOOL ROOM
AUTOMATIC LATHES
WE FLY THE ALL NAVY "E"

News of Industry • • •

Steel Output in May Exceeds April Total; Plate Record Is Set

• • • **Production of steel** during May exceeded the total produced in the shorter month of April and was within a fraction of 1 per cent of the peak set in March of this year.

According to the American Iron & Steel Institute report, a total of 7,386,890 tons of steel ingots and castings was produced in May, compared with 7,122,313 tons in April and 7,392,911 tons in March.

Steel production last month was 5 per cent higher than in May a year ago, when 7,044,565 tons were produced.

During May, the steel industry operated at an average of 98.2 per cent of capacity, as against 97.7 per cent of capacity in April. In May, 1941, when capacity was substantially less than at present, operations averaged 98.5 per cent of capacity.

An average of 1,667,470 tons of steel ingots and castings was produced per week during May, compared with 1,660,213 tons per week in April and 1,590,195 tons per week in May of last year.

Open hearth output set a new high mark of 6,600,376 net tons.

Steel plate shipments in May bettered the million ton mark, surpassing by more than 100,000 tons the previous record made in April, according to WPB at Washington. May shipments totaled 1,012,194 tons of which 425,211 tons were made on continuous mills.

↓ ↓

World's Record Broken by National Tube Blast Furnace

Pittsburgh

• • • **B. F. Harris,** president of National Tube Co., U. S. Steel subsidiary, has announced a new world's record for iron production by one of the company's blast furnaces in the northern Ohio industrial area. The single stack, which was placed in production early in 1941, produced 43,866 net tons of iron during May, exceeding its own previous record, established in April, by 5,285 tons, and the previous world's record by 388 tons. The increase over the earlier monthly record is equivalent to the iron needed for 15,000 large bombs.

↓ ↓

Jones & Laughlin Sets Ship Plate Output Record in May

Pittsburgh

• • • **A new record** in the production of ship plates was made in May in the plants of Jones & Laughlin Steel Corp. Production of other war-time products from pig iron to finished steel again exceeded previous records.

↓ ↓

Records by Wisconsin Steel

Chicago

• • • **Four departments** of the Wisconsin Steel Works of International Harvester Co. established new all-time production records during May, according to L. B. Robertson, general superintendent. Employees of the by-product coke plant exceeded the previous production record for that department, made in October, 1941, by 2900 net tons of coke. The blast furnace department exceeded the five-year-old record of that department by more than 3000 net tons of pig iron. The men of the open hearth department beat their previous record, established in March, this year, by more than 1500 tons, and the blooming mill department beat its previous record by more than 350 tons.

Robertson attributed a substantial part of the credit for the record-making production in May to the work of the employee-management committee on war production. One means by which the committee stimulated greater production in the plant during May was to sponsor competition between the coke and blast furnace departments.

↓ ↓

C. F. & I. Ingot Record

• • • **Smashing of** one more war production record was reported by the labor-management committee of Colorado Fuel & Iron Corp., Pueblo, Colo. Robert Leech, secretary of the committee, said employees smashed all previous ingot production records during May with total of 106,000 tons. Best previout record 98,000 tons. Also set more than 20 major production marks in other departments.

↓ ↓

April Steel Output 99%, Pig Iron 94% in Canada

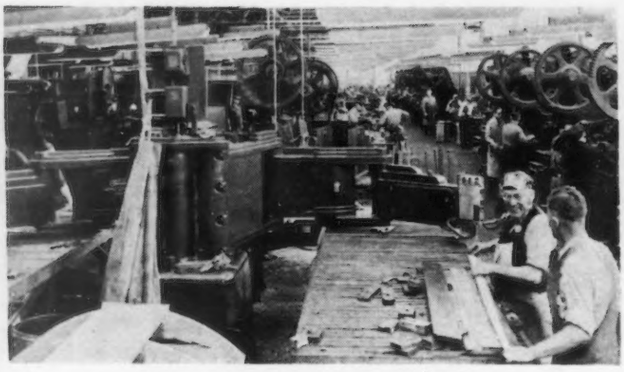
Toronto

• • • **During April** steel production in Canada held at 99 per cent of capacity, while pig iron was 94 per cent. The only idle stack was one being reconditioned at Algoma Steel Corp., Sault Ste. Marie. It has not been in blast for several years.

A new stack was blown in late in April by Canadian Furnace Co., Port Colborne, Ont., bringing total furnaces in Canada to 12. Canada now has a total rated pig iron production capacity of 2,123,320 net tons per year, a jump of approximately 70 per cent over the rated capacity of 1,250,875 tons at the outbreak of the war. Capacity is being further expanded with a new furnace at Sault Ste. Marie, and the removal of an unlined stack from U. S. Steel Corp., Ojibway, Ont., to the Sydney, N. S., works of Dominion Steel & Coal Corp. Ltd.

In April, pig iron output dipped to 160,408 net tons from 167,116 tons in March, compared with 115,727 tons in April of last year. For the four months ended April 30, production of pig iron was 634,653 net tons compared with 447,567 tons in the same period of 1941.

Ferro-alloys produced in April



BEFORE AND AFTER CONVERSION: Hudson Motor Car Co. reveals that one of its plants, shown empty at left, was in production of aircraft parts (at right) 29 days after automobile equipment was moved out of the building. New equipment, designed for aircraft work, was installed and much automotive equipment was retooled and installed for use on aircraft parts in this plant.

totaled 18,128 net tons compared with 20,261 tons in March and 18,100 tons in April of last year.

Output during April of steel ingots and castings totaled 264,988 net tons, compared with 265,903 tons this March and 224,761 tons in April of last year. For the first four months this year, production of steel ingots and direct steel castings rose almost 20 per cent over the same period in 1941, output standing at 1,032,828 tons and 845,780 tons, respectively.

↓ ↓

Armco Shipments Rise

Middletown

• • • **Record-breaking** shipments were made in May from the fabricating division of American Rolling Mill Co., according to J. R. Freeze, manager. At the same time new peaks were reached in three different phases of the division's operations.

The fabricating division is not a steel producing unit and devotes all its efforts to the fabrication of steel sheets and plants from other Armco plants into war material.

↓ ↓

23 New Production Marks Set In May by C-I Gary Works

• • • **The Gary, Ind.,** and South Chicago, Ill., works of Carnegie-Illinois Steel Corp., U. S. Steel subsidiary, established 23 new weekly and monthly production records in May. The increase in steel production over the previous record, established in March, was approximately 20,000 tons, equivalent to the steel needed for 700 medium tanks. The blast furnaces of the two plants exceeded by about 2,000 tons their previous high, also made in March.

↓ ↓

C-I Sets New High Marks In Pig Iron and Ingots

Pittsburgh

• • • **In May,** Carnegie - Illinois Steel Corp. set new high-marks when the company's furnaces turned out 1,453,106 tons of pig iron and 1,931,869 tons of steel ingots and castings.

Daily average production of 62,318 tons of steel during the past month established a new record for the company.

The total Carnegie-Illinois steel production for May approached 2,000,000 tons, and represents an increase over the previous monthly record, established in March.

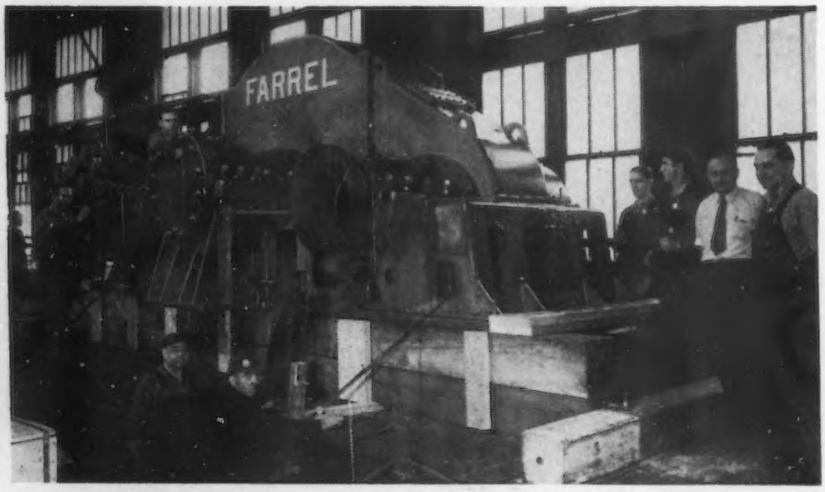
↓ ↓

Cold Metal Process Has Backlog Equal to 6 Months

Youngstown

• • • **The Cold Metal Process Co.** is almost 100 per cent on A-1-a orders and its current backlog amounts to six months' business, according to company executives. This jam of business has already necessitated a 50 per cent expansion in the company's heat-treating facilities, and further expansion will probably be necessary.

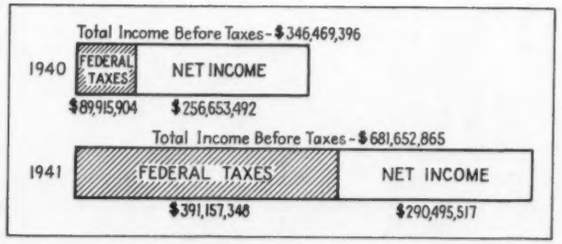
BEATING THE SCHEDULE: Workers for Farrel-Birmingham Co., Inc., Ansonia, Conn., celebrated Maritime Day recently by shipping the first of 20 drives for Maritime Commission cargo vessels ahead of contract schedule.



Steel Producer's 1941 Taxes Increased 335 Per Cent

• • • **Analysis of the** 1941 reports of 21 steel companies, who produce more than 90 per cent of the nation's steel, shows that their Federal taxes increased by 335 per cent over the year 1940, while net incomes were up by an average of 13 per cent.

Federal income and excess profits taxes in 1941, equivalent to $600 for each employee, were almost as large as the industry's entire net income plus taxes in the previous year. First quarter 1942 statements show additional increases in the percentage of income allocated for taxes, and proposed wage increases and price reductions would further reduce the net after taxes. Net income figures given here do not, of course, include any provision for dividends on preferred and common stocks.



Company	Income Before Federal Taxes		Provision for Federal Income and Excess Profits Taxes		Net Income		Per Cent of Gross Income Paid in Federal Taxes		Per Cent Increase in Net Income over 1940	Per Cent Increase in Taxes over 1940	Ratio of Federal Taxes to Net Income	
	1941	1940	1941	1940	1941	1940	1941	1940			1941	1940
U. S. Steel Corp.	$234,871,075	$128,511,282	$118,700,000	$26,300,000	$116,171,075	$102,211,282	51	20	13.7	351	102	26
Bethlehem Steel Co.	116,957,796	71,064,282	82,500,000	22,386,758	34,457,796	48,677,524	71	32	29.2d	269	239	45
Republic Steel Corp.	70,288,340	29,113,507	46,250,000	8,000,000	24,038,340	21,113,507	66	27	13.8	478	192	38
National Steel Corp.	36,927,350	22,544,036	19,825,000	7,477,696	17,102,350	15,066,341	54	33	13.5	117	116	50
Jones & Laughlin Steel Corp.	30,617,653	13,433,021	14,342,670	3,155,992	16,274,983	10,277,029	47	23	58.4	355	89	31
Youngstown Sheet & Tube Co.	37,624,401	12,580,468	21,500,000	1,765,000	16,124,401	10,815,468	57	14	49.1	1118	134	16
Inland Steel Co.	38,079,053	20,811,597	23,255,000	6,361,212	14,824,053	14,450,385	61	31	2.6	266	163	44
American Rolling Mill Co.	24,143,706	10,149,625	12,915,231z	2,506,911z	11,228,475	7,642,714	53	25	46.9	415	115	33
Wheeling Steel Corp.	16,072,440	7,311,153	7,566,136	1,625,305	8,506,304	5,685,848	47	22	49.6	367	89	29
Crucible Steel Co. of America	22,237,267	9,466,373	14,797,787	3,236,193	7,439,480	6,230,180	67	34	19.4	357	199	52
Allegheny Ludlam Steel Corp.	14,762,709	6,355,264	9,700,000	2,633,157	5,062,709	3,722,107	66	41	36.0	268	192	71
Pittsburgh Steel Co.	6,794,598	1,972,699	3,625,000x	416,700	3,169,598	1,556,000	53	24	103.0	642	114	31
Rustless Iron & Steel Corp.	7,659,627	2,549,993	5,325,000	1,274,000	2,334,627	1,275,993	70	50	82.9	318	228	100
*Colorado Fuel & Iron Corp.	3,085,218	2,101,069	796,900	356,200	2,288,318	1,744,869	26	17	30.6	124	35	20
†Lukens Steel Co.	3,890,605	889,888	1,695,000x	180,400x	2,195,605	709,488	44	20	209.4	840	77	25
Otis Steel Co.	4,495,943	967,007	2,326,189	250,000	2,169,754	717,007	52	26	202.6	830	107	35
Sharon Steel Corp.	4,233,364	1,796,822	2,600,000	460,000	1,633,364	1,336,822	60	26	22.2	465	159	34
*Keystone Steel & Wire Co.	2,316,811	1,727,351	698,435	309,130	1,618,376	1,418,221	30	18	14.1	126	43	22
Wickwire Spencer Steel Co.	1,947,463	20,368	369,000	6,600	1,578,463	13,768	18	32	1136.5	5491	23	48
Continental Steel Corp.	2,125,674	1,193,388	900,000	414,650	1,225,674	778,738	42	35	57.3	117	73	53
Alan Wood Steel Co.	2,521,772	1,910,202	1,470,000	700,000	1,051,772	1,210,202	58	37	13.1d	110	140	58
	681,652,865	346,469,396	391,157,348	89,815,904	290,495,517	256,653,492	57.4	25.9	13.2	335.2	135	35

d = Decrease † = Fiscal year ends Oct. 31 * = Fiscal year ends June 30 x = Includes State Income Taxes z = Includes state and foreign income taxes

Tin Cans On Way Out As Open-Hearth Scrap

Pittsburgh

• • • **Wholesale consumption** of tin cans in the country's open-hearths has about ended following disclosures of unusual amounts of tin being found in sample tests of heats made recently at some steel plants.

This subject was the cause for heated debate at a recent Iron and Steel Institute meeting and a committee was formed to thoroughly investigate the possible accumulations of tin in steel.

However, before any concrete results were obtained from such a committee, several companies had decided to rule out tin can scrap which had not been detinned. No major steel company in this district is now accepting tin cans for open hearth consumption except in one or two cases where a furnace has been isolated and the scrap closely watched. Major fear is that the "letting down of the bars" in the use of tin can scrap several months ago when a serious shortage existed has polluted some "home" scrap to an extent where the tin content is believed to be too high to allow a continuation of this practice.

One steel company recently, upon testing a heat of steel, found 0.16 per cent of tin, an amount considered to be far above comfortable limits. Some steel company metallurgists insist that steel containing more than 0.02 per cent tin is hard or impossible to deep draw successfully and may, in some cases, show characteristics of brittleness.

Even when tin can scrap might be used in steel heats for producing products, the fabrication of which might not be hindered by small tin content, scrap from this steel over a period would be bound to contaminate other steels which were not made with the use of tin can scrap. It is the spectre of the growing accumulation of tin in the nation's "home" scrap supply which has caused most steel companies to turn thumbs down on this type of scrap. This trend may force a change in some scrap distribution practices whereby tin can scrap in certain ratios was accepted when regular scrap was furnished.

O.E.M. Photo

"MINING" RAILS: Invented by an Asheville, N. C., machine shop manager, this machine pulls up 25 tons of buried rails per day. A cable from the end of girders runs through pulleys, then through a winch on the back of the tractor. The rail shown in photo was covered with brick and asphalt.

Hunting Season at Steel Plant

Buffalo

• • • **Terminating a half** hour chase through traffic in Lackawanna, city police shot and killed a deer at the main gate of the Lackawanna plant of the Bethlehem Steel Company last weekend.

Navy Honors Locomotive Co.

• • • **Renewal of the** privilege to fly the Navy "E" pennant for achievements in the production of Naval ordnance has been granted the American Locomotive Co. The company was first cited for the Navy's industrial incentive award, Oct. 24, 1941.

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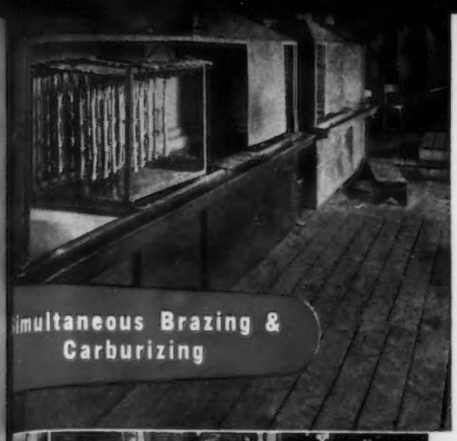

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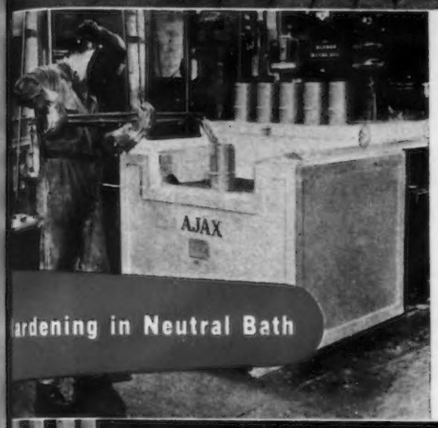
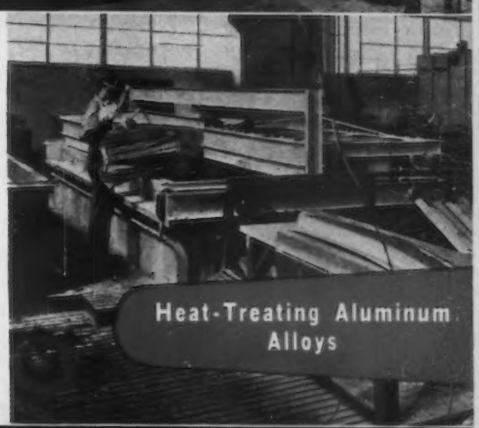
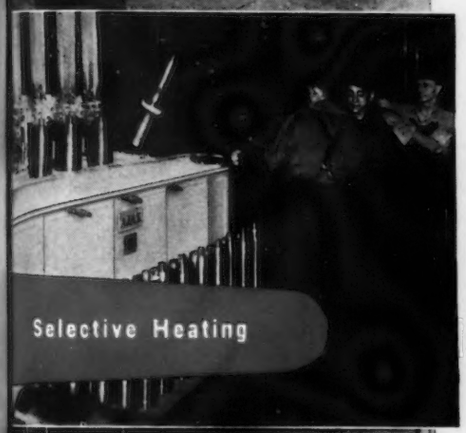


ardening in Neutral Bath



Heat-Treating Aluminum Alloys



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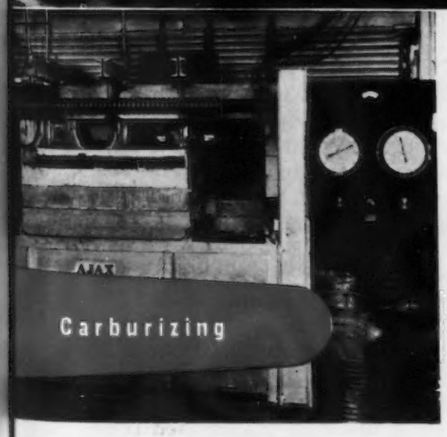

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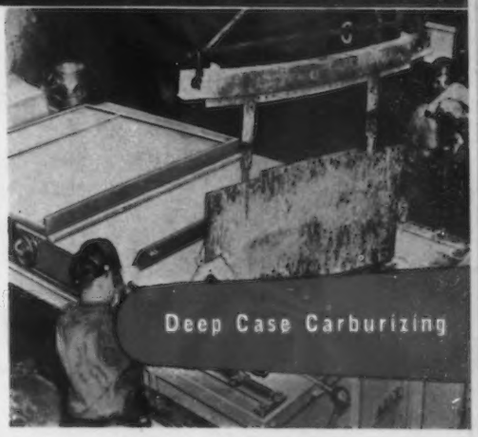

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Fear of NE Steels Unfounded, ASM Hears

Cincinnati

• • • **Regardless of** whether they like it, the exigencies of total war have forced the low alloy National Emergency steels upon American industry and industry must learn to use these new steels, speakers at the annual Tri-Chapter meeting of the American Society of Metals told the 300 metallurgists and plant executives attending the meeting.

The hesitancy of some plants in going over to the NE steels is largely unfounded, the metallurgists were told, for the NE steels are founded on intelligent metallurgical reasoning and no unsurmountable obstacle will be encountered in the substitution.

The only real danger of getting into trouble, they were warned, was in the possibility of mixing the NE grades with the older alloy types during the transition period. The NE steels generally require lower heat treatment temperatures than the older types and if subjected to the heat treatment practice used for the older types, will lose their effectiveness.

Steel companies are planning to mark the new steels in a manner to permit quick and easy identification. The plant management, however, has the duty of seeing that all employees who handle steel are acquainted with these markings.

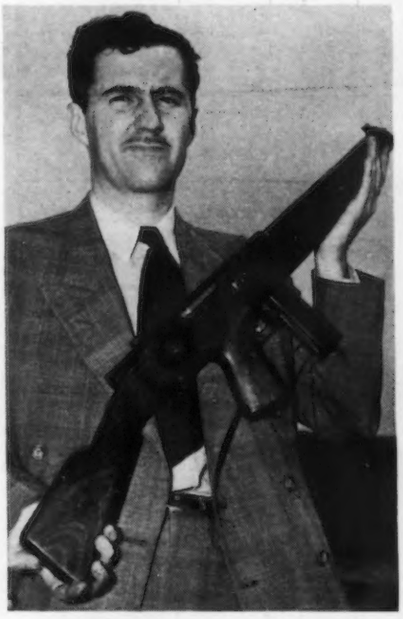
The NE steels are not yet in large scale production. A few heats were poured in May and are being rolled, largely into bars, this month. A larger tonnage is scheduled to be produced this month.

The outstanding obstacle to a quicker change over to the NE grades was said to be the lack of technical data on their characteristics and performance. This is being fast remedied, however, and very shortly a substantial amount of data should be available. The collection of such data is being centralized through one committee and is being published as rapidly as it is collected. The American Iron and Steel Institute recently issued a loose leaf collection of such data as is available now, some of it based on single heat tests, and the ASM has prepared a booklet covering various aspects of the use of NE steels.

The general consensus among the metallurgists at the meeting was that some of the present NE specificatoins may have to be altered slightly, particularly in the carburizing grades, but on the whole they thought the setup was well prepared and expressed high praise for the men who prepared them in such a short time.

Indicative of the growing interest in the NE steels was the fact that attendance at the meeting was about double that anticipated and the sessions had to be shifted to larger meeting rooms. Donald M. Nelson, WPB chief, and William B. Harrison, head of WPB's production division, telegraphed congratulations to the chapters sponsoring the meeting. The meeting was arranged by the Tri-Chapter Committee, under the chairmanship of A. J. Smith of Lunkenheimer Co. The technical sessions were led by Hans Ernst, director of research for the Cincinnati Milling Machine Co. and Cincinnati Grinders, Inc.

Speakers at the various sessions



Acme Photo

NEW LIGHTWEIGHT MACHINE GUN: Weighing 6½ lb., and only 29-in. long, this new gun can fire 510 bullets a minute. It has only 31 parts. William D. Hammond, Los Angeles, the inventor, exhibits the gun in this photo.

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Marschke Disc Grinder with adjustable work rests.

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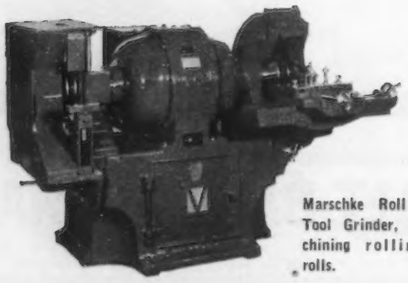
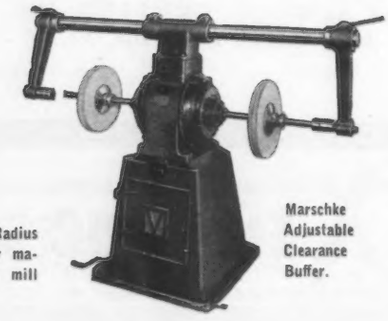


Marschke Roll Radius Tool Grinder, for machining rolling mill rolls.



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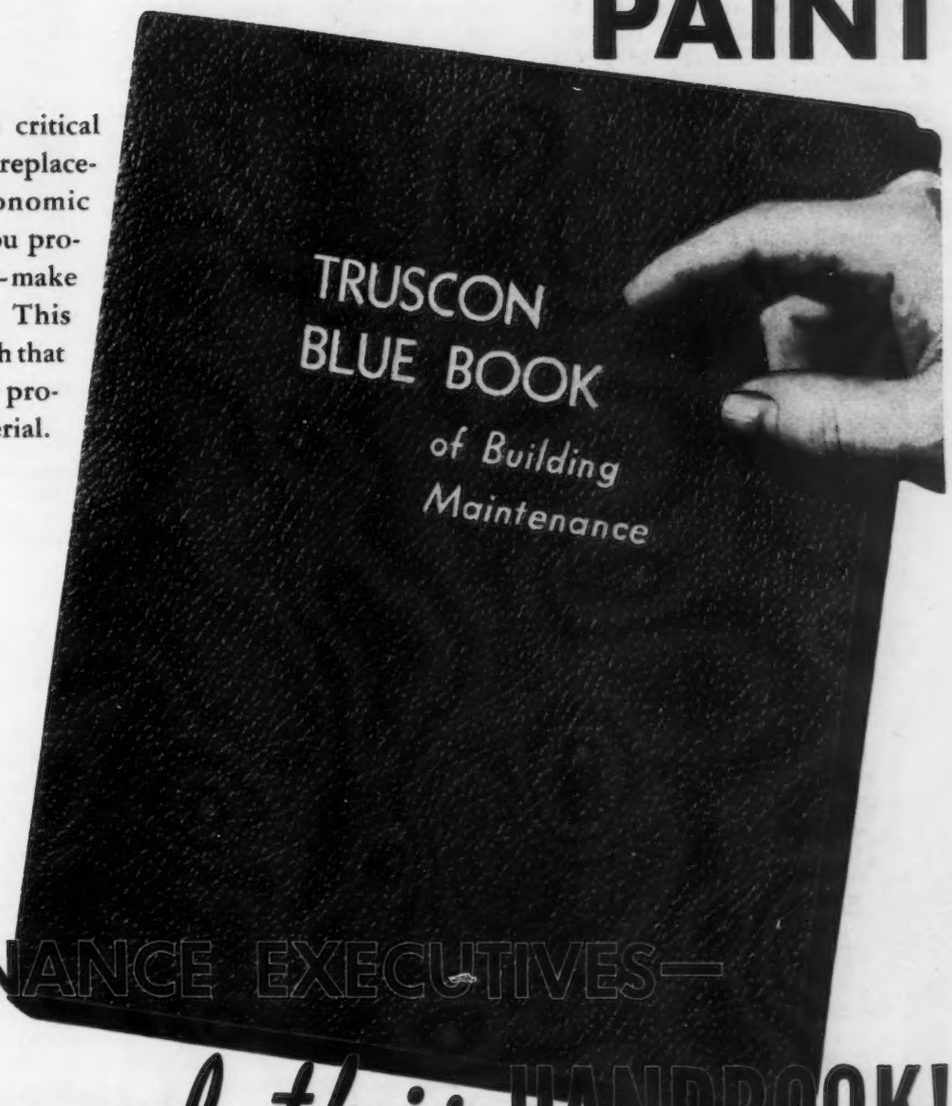

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TRUSCON LABORATORIES

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included E. J. Hergenroether, Iron and Steel Branch, WPB; Waldemar Naujoks, chief metallurgist, Steel Improvement & Forge Co., Cleveland; Howard Stagg, vice-president, Halcomb Steel Division, Crucible Steel Co. of America; E. F. Davis, chief metallurgist, Warner Gear Division, Borg-Warner Corp., Muncie, Ind., and Robert S. Archer, chief metallurgist, Republic Steel Corp., Chicago. Dr. M. A. Grossman of Carnegie-Illinois Steel Corp., Chicago, also contributed to the sessions in the form of a written discussion of a new method of calculating the hardenability of steels developed by Carnegie, a method especially appropriate to use with the NE steels.

Hergenroether of WPB, explaining the background of the development of the NE steels, pointed out how unbalanced the supply of alloying material would be if the older high alloy specifications were adhered to. To compensate for reduced use of certain other alloys, the NE steels generally will boost Mn requirements. However, on the basis of present stocks, imports and anticipated domestic production, sufficient Mn should be available to cover requirements of the next few years.

Adoption of NE steels, plus better segregation of nickel scrap, will probably permit balancing of nickel requirements in 1943, although the balance will be very delicate. For the current year, however, a shortage of nickel needs is indicated.

NE grades will use more Mo than the older types and this material will be very tight for some time. The favorable item in the Mo picture, however, is that it is largely domestically produced and efforts are underway which should expand home output.

The lower alloy NE steels will forge more easily than some of the high alloy material that has been in use up to the present, Naujoks reported. Any loss in physical values in the changeover can be compensated for by better designing, he said, and by better utilization of the influence of grain flow. The speaker said he didn't anticipate any new or unusual scaling problems with NE steels. The only possible problem he foresaw was in the making of the forging dies themselves. Replacement of the present Cr-Mo-Ni metal used for such purposes will probably be difficult, he said.

Wide World Photo

HANDY SHOVEL FOR AIR RAIDS: Christian Marx, Los Angeles inventor, with his bomb shovel for removing incendiaries. Smothering material in a paper sack in the shovel drops on a fire bomb, extinguishing it. Then the shovel is used to remove the bomb.

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DENISON EQUIPMENT for APPLIED HydrOILics

One engineer present [illegible] at it appeared now that [illegible] would probably be used [illegible] SAE 3140 and 4140 [illegible]chine tool plants.

Stagg of Republic, who discussed die steels, reported that the reduction of Va in die steels would not cause any great difficulties. He warned that this would, however, lower the hardening temperature and proper identification of the new steels was vital to avoid using the wrong temperatures. The effect of the reduced Va content on wear and size is not certain. The answer will wait actual production runs, he said.

Davis, discussing the use of emergency steels in gears, said he would be inclined to try Amola steels, in preference to some of the NE types because the Amola steels have more background and field experience. The Amola steels, a low alloy type developed some time ago by Chrysler, are backed up by considerable technical data due to their wide use by Chrysler and other plants. He reported that Amola type 4000 series was finding use as a replacement for the 4800 type in gear parts. Other substitutions he mentioned included the 4620, 6120, 4120, and 4320 by 4027 and 4037.

When using Amola steels where carburizing is necessary, Davis recommended going to 0.25 to 0.35 C for better machinability and core hardness. For large three pitch gears, something around 4047 was suggested as adequate, although it might be necessary to go a little higher if the gear section was especially large. Davis said that he was of the opinion that no important difficulty would be experienced in machining the NE steels.

A point stressed by all the speakers was that the success of the changeover from older types to the emergency grades would rest largely with the metallurgist. The lack of time would not permit use of the usual cut-and-try methods.

CIO Wins Republic Election

Buffalo

• • • **The United Steelworkers** of America, CIO, won over the Switchmen's Union of North America in a collective-bargaining election among train conductors, switchmen and switchmen's helpers at Republic Steel Corporation's Buffalo plant.

Howard F. Black Named To WPB Post in South

Birmingham

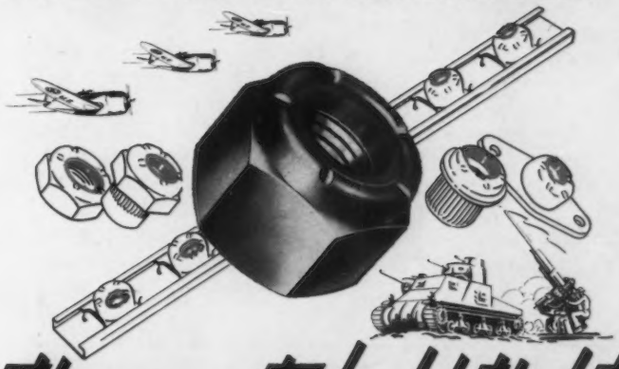
• • • **Howard F. Black,** formerly an auto dealer in Youngstown, Ohio, has been appointed district chief for Alabama, Mississippi and Tennessee for the auto graveyard section, Bureau of Industrial Conservation, War Production Board. Black has his offices in the Phoenix building here.

Keystone Carbon Co. Expands Plant in Penna.

St. Marys, Pa.

• • • **The Keystone Carbon Co.,** here, manufacturers of precision molded products, is completing a large expansion of plant and production facilities, necessary because of the increased demand for materials produced by powder metallurgy.

WHEN THE BIG TEST COMES



these nuts hold tight

Bolted connections on military airplanes call for lock nuts that hold with a grip which is positive and yet resilient . . . a grip that withstands the complex vibrations, the stresses, and the shocks, of high-speed maneuvering . . . a grip that protects the ships and the men who fly in them.

Evidence that Elastic Stop Nuts meet these all-important requirements is found in the fact that they are used for vital structural and equipment fastenings on **every** military airplane built in the Western Hemisphere.

There are more Elastic Stop Nuts on American airplanes, tanks, and other war equipment, than all other lock nuts combined.

WITH THE RED LOCKING COLLAR . . . SYMBOL OF SECURITY

ELASTIC STOP NUTS **may be the solution to *your* fastening problems. Sample nuts, for testing, will be furnished without cost or obligation.**

» Write for folder explaining the Elastic Stop self-locking principle.

ELASTIC STOP NUT CORPORATION · 2368 VAUXHALL ROAD · UNION, N. J.

Elastic Stop SELF-LOCKING NUTS AND AIRCRAFT FITTINGS

HELP AMERICA KEEP 'EM FLYING

Coated Products Corp. Is Organized at Pittsburgh

Pittsburgh

• • • **The Coated Products Corp.** which has leased part of the idle plant of the Pittsburgh Cold Rolled Steel Co. at Verona, Pa., has been organized here recently for the purpose of weatherproofing pre-fabricated metal and shapes.

According to M. I. Dorfan, vice-president and manager of the company, the process involves the use of plastic pitch in the place of galvanizing for protection against corrosive atmospheric conditions. According to the company, only pre-fabricated or pre-formed methods are used, with no further shaping or forming required after the plastic pitch application is completed. The coating is applied by the dip method. Officers of the company are: G. H. Kann, president; Mr. Dorfan, vice-president and general manager; W. L. Kann, treasurer; and A. L. Weil, Jr., secretary.

OPA's Complaint Against Weirton Steel Dismissed

Pittsburgh

• • • **The OPA failed** last week to obtain an injunction against the Weirton Steel Co., subsidiary of National Steel Corp., on a complaint charging violation of the scrap rulings. According to news received here, Federal Judge J. C. Collet, Kansas City, Mo., dismissed the OPA's request for an injunction.

Gray Iron Founders' Society Passes 500-Plant Figure

• • • **Membership** in the Gray Iron Founders' Society, Inc., with headquarters in Cleveland, has passed the 500-plant figure. There are no individual members. The closer cooperation between the main office and members on matters relating to production, priorities, etc., has created greater interest in the work of the Society.

Army Air Force Probes Strikes and Slowdowns

Cleveland

• • • **Intermittent strikes** and slowdowns that have occurred at the Aluminum Co. of America's Cleveland plants have finally resulted in an investigation to establish the reason behind these interruptions, and the inquiry is being conducted by two inspectors for the Army Air Force. Members of the CIO Mine, Mill and Smelting Workers Union are being questioned, as well as company officials and other persons.

One-Day Strike Hits Cleveland Welding Co.

Cleveland

• • • **War work and production** of "victory" bicycles was resumed at the Cleveland Welding Co. after a one-day strike on June 2 by 800 members of three AFL unions, because of a pay rate dispute. Production subsequently was resumed after 500 of the men voted to return to work. The stoppage was caused by the discharge of 19 men who refused to work when the company rejected a wage increase demand. U. S. conciliators are arbitrating the difference.

War Production Plants Get 10,000 Bicycles

• • • **Almost 10,000** bicycles have been released already by the OPA to war production plants which are qualified to buy them for transportation of workers and for messenger service, Administrator Leon Henderson announced June 4. Heaviest demand has come from California aircraft plants. The releases range in number from the 5766 which Douglas Aircraft Co. at Santa Monica, Cal., has been authorized to purchase, down to single bicycles in a number of cases.

OPA has made these bicycles available, in advance of the contemplated rationing program, under a section of its Ration Order No. 7 which provides for releases to an industrial establishment certifying that over 50 per cent of its orders or deliveries during April bore a preference rating of A-10 or higher. Applications under this section must be made direct to the OPA headquarters in Washington, D. C.

"HERCULES" REG. U.S. PAT. OFF. RED-STRAND WIRE ROPE

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
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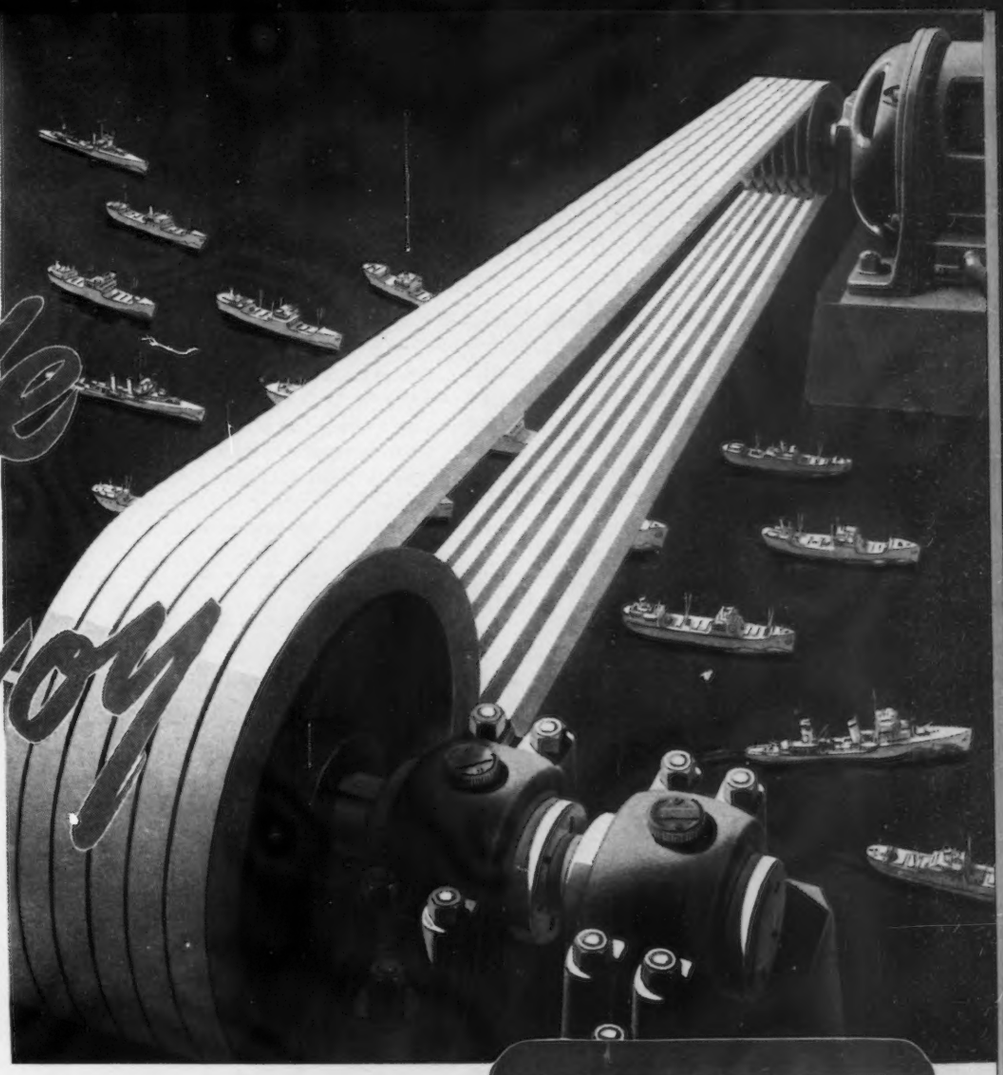
Safe Convoy



FOR VICTORY'S VITAL POWER

DODGE D-V DRIVES are stationed at almost countless battle sectors along the vastly extended industrial front . . . keeping open the channels from power source to driven shafts through which flow Victory's vital power . . . on 'round-the-clock schedules constantly warding off the raids of friction and waste—guarding against interruptions—convoying power safely to greatly accelerated production machines.

Dodge D-V Drives are complete power transmission units of Matched Quality — sheaves and V-belts are built for each other — designed to eliminate slip — to absorb sudden shock and to provide a clear passage for power at all speeds. Accurate machining of sheaves results in even pull on each belt — reduces wear, and insures the continuous, uninterrupted operation demanded by our war production plants.

Dodge D-V Drives are but one part of the complete Dodge line — bearings, clutches, pulleys and other power transmission units which "convoy" power to Victory production lines.

Depend upon Dodge for . . . "The Right Drive for Every Job."

DODGE MANUFACTURING CORPORATION, ***Mishawaka, Indiana, U. S. A.***

Why MATCHED QUALITY MEANS BETTER PERFORMANCE

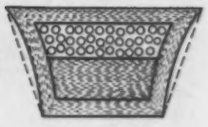


Fig. 1 shows D-V Belts with concave side walls.

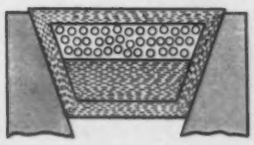


Fig. 2 shows the perfectly straight surface formed by the belts in contact with the groove when flexing over a sheave.

Fig. 3 shows how belts seat in accurately machined grooves of uniform dimensions. This means even "pull" with no loafing belts.

Fig. 4 shows what happens when groove dimensions are not uniform.

THE RIGHT DRIVE FOR EVERY JOB

New Plane Parts Shown at Detroit

Detroit

• • • **Noteworthy advances** in design, materials, testing equipment and methods of production of aircraft parts and aircraft engine parts were displayed in Detroit on Monday by Ford Motor Co. in connection with a joint meeting of members of the Society of Automotive Engineers, Detroit Section, and The Engineering Society of Detroit.

The exhibit and meeting were held in the Horace H. Rackham Educational Memorial, Detroit's engineering society headquarters, and between 4000 and 5000 engineers attended the display and the three technical discussions held at 11 a.m., 3 p.m., and 8 p.m. For SAE members the affair was a replacement for sessions at White Sulphur Springs, cancelled because of wartime conditions.

Honored guests at the joint meeting and exhibit were members of the National Inventors Council, led by Dr. Charles F. Kettering, head of General Motors research activities, and Fred M. Zeder, vice-chairman of the board of Chrysler Corp. Col. A. W. Herrington, national SAE president, just returned from India where he accompanied Louis Johnson, former assistant secretary of war, also an honored guest.

In the exhibit, especial interest attached to a display of castings and fabricated parts which demonstrated some of the recent rapid changes in aircraft manufacturing. Specimens of magnesium castings showed how the number of gates on a reduction gear housing has recently been three to one, and the number of risers from eleven to one. Cast steel crankcases which may replace forged aluminum crankcases also were shown.

The widely discussed centrifugally cast aircraft cylinder barrels and cast steel landing gear parts developed by Ford also were in the exhibit. Samples of the cylinder barrels which had burst in hydrostatic tests at high yield points and only under great pressure were exhibited. The landing gear parts demonstrated great simplification of design, reduction

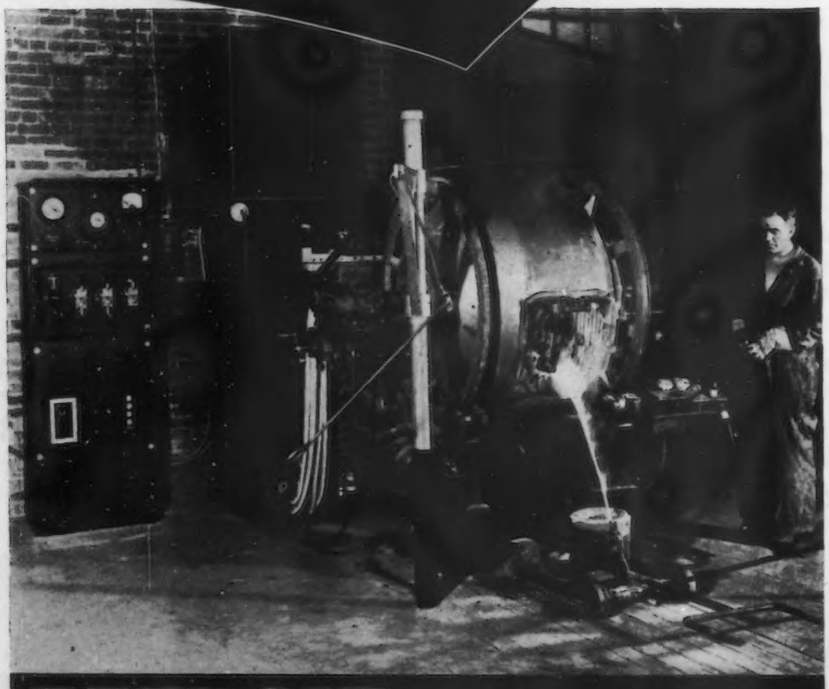
FAST • FLEXIBLE • ACCURATE

Detroit Electric Furnace performance records over the past 24 years have proved that this efficient furnace will:

1. Reduce the man-hours of labor per ton of product.
2. Increase the production per unit of floor space.
3. Reduce metal losses.
4. Increase the yield of good castings.

The net result is more good product at lower cost.

Detroit Furnaces are available in sizes from 10 pounds to 8,000 pounds for melting either ferrous or non-ferrous metals and alloys. Write today for complete facts.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

MAKING BOMBERS PIECE-BY-PIECE: Hudson Motor plant worker Mary Smith turns out a turret part for a U. S. Army bomber. Women work alongside men in the stepped-up battle of production these days.

Wide World Photos

Keep 'em Rolling on the Home Front

TAKE THE HEAT OFF BEARINGS... PUT IT ON PRODUCTION with SOLNUS OILS

"Bearings, lubricated with a competitive lubricant, ran hot . . . caused frequent shutdowns. Curtailment of production was a natural result. Survey of operating conditions was made, Solnus Oils (Medium) recommended. Results: hot bearings stopped . . . shutdowns made only for periodic repairs . . . production quotas boosted."

That's a typical report on a lubrication problem, in a large paper mill, that was solved by a Sun Oil Engineer—one of those Doctors of Industry. Another example of how their engineering service and Sun Industrial Products working as a team are helping industry win its greatest battle of production.

Whether it be a metal working problem to be answered . . . a processing formula to be revised . . . or power drag to be eliminated Sun's Doctors of Industry always stand ready . . . willing . . . and able to help you. Their services are yours to use for improving production . . . the products they have to offer have been developed to maintain that improved production.

Today, tomorrow, or whenever you need help, call in a Sun Doctor of Industry. Let him prove to you the value of applying the right petroleum in the right place. Write . . .

SUN OIL COMPANY, Philadelphia

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO

SUN PETROLEUM PRODUCTS.. HELPING INDUSTRY HELP AMERICA

of manufacturing time and weight reduction and, in some cases, improvement in strength. Cast steel crankshafts and camshafts, both adaptations from automotive practice, were shown in both the rough and finished state.

A variety of plastics parts, now in production or ready to be put into production, were on hand to lend substantial support to the possibility that these materials may go far to substitute for aluminum magnesium and steel in aircraft. Landing gear and shock strut caps of plastic in the display showed great weight reduction possibilities, ranging up to 20 to 50 per cent, compared with aluminum. Map cases of plastic, wind deflectors and bombardier doors of plastic, side-by-side with aluminum counterparts, completed the picture of the role that these materials are being counted on to play.

Among the sheet metal parts were single stampings for bomber enclosure frames which are now being produced with only three pairs of iron dies, replacing a riveted "built-up" assembly that formerly required 160 dies for the various small parts involved. A bomber engine cowling and bomb bay doors in which spot welding replaces rivets were in the sheet metal display.

TANK SHOW FOR YANKS: Gen. Richard K. Sutherland (left) of the U. S. Army, and Col. W. D. Watson, Australian tank designer, stand before large Australian-built heavy cruiser tank exhibited in maneuvers for U. S. troops, in Australia.

Associated Press Photo

Forgings by Standard
are **RIGHT**

Since 1795 Standard has maintained a reputation for quality forgings. Standard products have continually met the service requirements of industry by rigid control of every step in the manufacturing process from open hearth to finished forging. Customers' specifications have been fulfilled and customer satisfaction has increased.

Today Standard is serving the nation to the utmost, with highest quality constantly maintained. The materials going into Standard products are carefully analyzed by expert metallurgists and chemists using the most modern testing equipment. Trained personnel and large shop facilities guarantee dependable product performance.

For users of forgings, this product superiority means extended service life, and a large contribution toward reduction in operating costs.

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

STANDARD STEEL WORKS

DIVISION OF
THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

Air Conditioning Adds 10% to Furnace Output, Says Dunne

Skytop, Pa.

• • • **Enough extra steel** every four months to build a battleship can be obtained by air conditioning a single blast furnace, Russell V. D. Dunne, Carrier Corp. engineer, told the American Society of Refrigeration Engineers, meeting here June 8. He estimated that provision of "dry blast" air conditioning for 50 blast furnaces would result in production increases of at least 10 per cent, or a total of 1,800,000 tons of steel from the 50 furnaces.

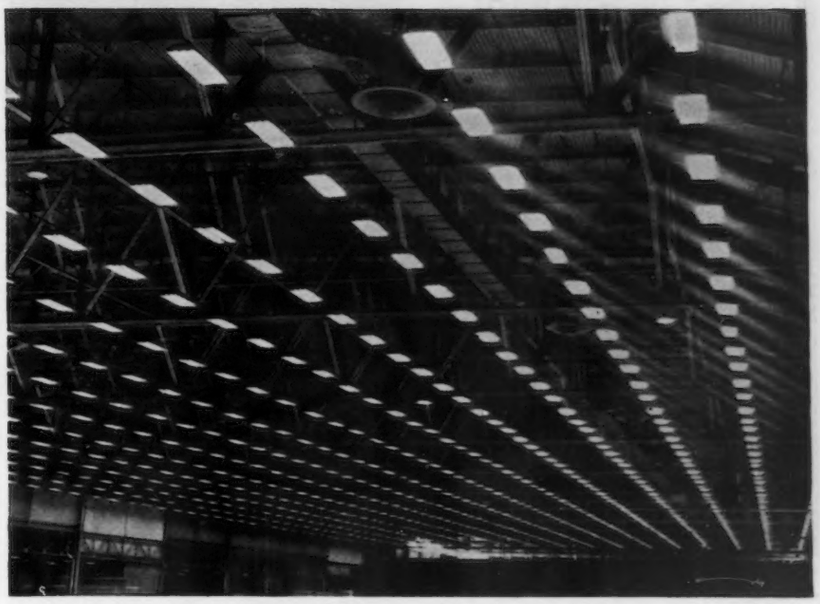
Bureau of Mines Reorganized, New Assistant Director Named

• • • **Reginald S. Dean,** chief of the metallurgical division, Bureau of Mines, has been appointed assistant director of the bureau. At the same time, related endeavors of the bureau have been consolidated and unified with the objective of putting properties into production as soon as possible.

SPEEDY RIVETER: Carl Simon, right, of Los Angeles, and his crew drove 1456 rivets into a Liberty ship in an eight-hour day. The rivets really fly like bullets when he and his bolter, Edward Cook, start working. However, on June 5, Lloyd H. Lakness, riveter at the Oregon Shipbuilding Corp., drove home 1745 rivets in the hull of a Liberty freighter in 7 hr., 15 min.

Acme Photo

Where + or - 2°F. CAN BE A SABOTEUR!



Men who build war plants not only talk about the weather — they *do something* about it. There is no other way out when a temperature change of 2°F. can throw precision instruments more than 1/1000th of an inch out of line! Air conditioning is the answer.

Many air conditioning ductwork systems are constructed of galvanized ARMCO Ingot Iron. Engineers specify this durable metal because it has the longest actual service record (36 years) of any low-cost iron or steel sheets. Yet with all its durability ARMCO Ingot Iron costs on the average only about 1c a pound more than ordinary galvanized metal.

Long service life is important in the construction of buildings too. That's why corrugated ARMCO Ingot Iron is being used for roofing and siding on so many new structures needed for army ordnance and arms production. Engineers are not losing sight of the post-war value of these emergency buildings.

If you are designing buildings or air conditioning systems for war production write for complete information about galvanized ARMCO Ingot Iron*. We'll give you proof of its long life and low maintenance cost. The American Rolling Mill Co., 2201 Curtis Street, Middletown, Ohio.

** For immediate painting and long paint life ask about galvanized ARMCO Ingot Iron PAINTGRIP sheets.*

GALVANIZED ARMCO INGOT IRON

XLO MUSIC WIRE is in constant demand because it has a great variety of uses. Meets all commercial and governmental specifications for high grade steel spring wire. All sizes from .003 to .200. Packages—¼ lb., ½ lb., 1 lb. & 5 lbs.

Johnson Steel & Wire Co. has enlisted a heavy production of music wire for the war.

JOHNSON STEEL & WIRE CO., INC.
WORCESTER ★ MASSACHUSETTS

NEW YORK — AKRON — DETROIT — CHICAGO — LOS ANGELES — TORONTO

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

Any Metal • Any Perforation

The uses for perforated metals are numerous and increasing. Industry requires it for a thousand purposes.

For ornamentation it provides beauty of design not otherwise obtainable. We offer a finished product, developed to fully meet the requirements you specify.

The Harrington & King PERFORATING Co.

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New York Office, 114 Liberty Street

Nelson Names Group To Study Facts on Air Freight

• • • **Creation of a special** committee on cargo planes was announced June 2 by Donald Nelson, chairman of WPB. The purpose of the committee is to obtain all the available facts relating to cargo planes, including the past use of airplanes for carrying cargoes and the future possibilities of such transportation techniques as they relate to war production problems. Members of the committee are:

Harold E. Talbott, deputy director of the production division, WPB; T. P. Wright, assistant chief, aircraft branch, production division, WPB; William Barclay Harding, vice-president of the Defense Supplies Corp., (American Republic Division) of the Reconstruction Finance Corp.; Lewis Douglas, deputy to Admiral Land in the War Shipping Administration; Dr. Jerome C. Hunsaker, chairman of the National Advisory Committee for Aeronautics; Robert Hinckley, Assistant Secretary of Commerce, in charge of aviation; Col. Royal B. Lord, assistant director, Board of Economic Warfare; Grover Loening, aeronautical designer and manufacturer; and Gerard B. Lambert, WPB executive staff member and chief of liaison.

Wolverine Tube Made Division Of Calumet & Hecla Copper

• • • **A. E. Peterman,** president of the Calumet & Hecla Consolidated Copper Co., has announced the purchase of the entire assets and liabilities of the Wolverine Tube Co. of Detroit. Operations will continue at the plant and offices as the Wolverine Tube Division of Calumet and Hecla Consolidated Copper Co. with production for the war effort uninterrupted.

72% of Metal Show Space Chosen

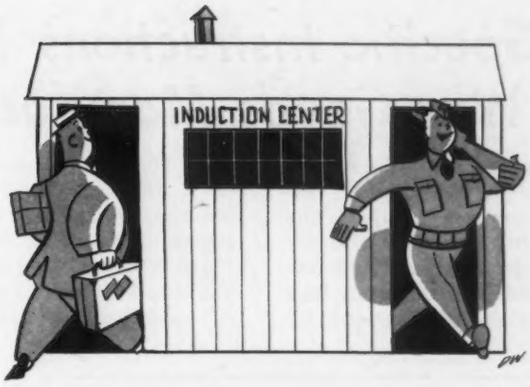
• • • **Seventy-two per cent** of the exhibit space in the war production edition of the National Metal Exposition was assigned to more than 125 manufacturers June 3, two weeks after the first announcement that this event would be held in Cleveland's Public Auditorium during the week of Oct. 12.

"Foundry Work" by Wendt Goes into Fourth Edition

• • • **The fourth edition** of "Foundry Work," an elementary textbook on foundry practice written by R. E. Wendt, head instructor in foundry practice of Purdue University, has been published by McGraw-Hill Book Co., New York. The book is rather simply written, the subject matter is arranged in an orderly manner, and the explanatory sketches are especially well done. It should be of value to apprentices and other beginners in foundry work. In addition to molding, both bench and floor, the book covers pattern equipment, casting design, melting and mixing metals, core making and a touch of foundry management. It contains 260 pages and is priced at $2.

OLD TIMERS REPLACE YOUNGER MEN: The role being played in the victory drive by men over 40 is increasing. Last week at New York, Col. A. V. McDermott, director of Selective Service, warned war industries that they are going to lose young, semi-skilled, able bodied men without dependents by the "tens of thousands" within the next six months.

O.E.M. Photo



THIS IS CONVERSION!

Let any man who hesitates to convert his plant from peace production to war production take a look at Mr. Buck Private. His case is *real* conversion.

He's been converted from a shipping clerk, a gas station man, a farm hand, or a bond salesman into a hard-muscled, hard-hitting, tough-fighting "son of a gun."

He has given up, for the time being, his future, his ambitions, and his home and family life. Whether he ever comes back from the fight over there, or whether he doesn't, is in the hands of Fortune.

Conversion is not easy . . . not easy for anyone. But today we are in a war . . . the most difficult war we have ever fought. The question is not "What is comfortable and easy?" It is "What must we do to survive?"

The hard fact is that if we are going to survive we must outproduce the enemy—and to outproduce the enemy we must convert peacetime plants to wartime plants.

Geo. D. Trundle Jr.

P.S. Every man jack in my organization is on some war job today.

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

GENERAL OFFICES · CLEVELAND · BULKLEY BLDG.
CHICAGO · City National Bank Bldg. · 208 S. La Salle Street
NEW YORK · Graybar Building · 420 Lexington Avenue

PRP Specific Instructions To War Goods Manufacturers

• • • **Specific instructions** of operation under the Allocation Classification system as set up by the WPB are continued with this issue. In the June 4 issue, classes 1.00 to 10.00 were covered, and this issue deals with classes 11.00 to 15.00. The classes of industry from 16.00 to 23.00 will be described next week, completing the series.

Class 10.00—Transportation

10.10—Railroad including Urban and Interurban

All railroads, railways and street car companies should place this allocation symbol on all purchase orders that they issue except for construction of new buildings and building maintenance and repair (see classes 21.00 and 22.00).

Purchase orders for mine railroad equipment and privately owned intra-plant railroad equipment should not transmit this symbol but should bear the proper industry symbol.

10.20—Automotive

All companies manufacturing automobiles, trucks, buses, trailers, taxis, automotive repair parts and accessories, tires, retreading machinery, etc., should place this allocation symbol on all purchase orders that they issue except for the construction of new buildings and building maintenance and repair (see classes 21.00 and 22.00).

The complete symbol classification for Military, Industrial, and Civilian industries are shown in The Iron Age Priorities Guide. Sixth edition, June 4 issue.

10.30—Roads, Streets, etc., Construction and Maintenance of

All orders for the construction, maintenance and repair of roads, streets, automobile bridges and tunnels, storm sewers, highway signs and fences, traffic lights and other traffic control facilities should carry this allocation symbol.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

The responsibility for placing this classification number on the order lies with the contractor or the local, state or federal government agency which originates the order.

10.40—Water Transportation, including Construction of privately owned Shipyards

All orders for material, equipment, and supplies for the construction of ships (other than those classified under "military" which will be placed in class 2.00 by the government department placing the order) operating supplies, repair and maintenance of the ships themselves, ship safety devices, lighthouses, docking facilities, loading and unloading equipment,

CAUGHT
WITHOUT THE GOODS

● The time to stop sabotage, espionage and theft is not after it happens, but before. A.A.I. Automatic Alarms perform this duty with uncanny accuracy in a modern, efficient way. Tiny "robot sentries," or detectors, attached at intervals along fence lines enclosing important properties and plants, serve as supersensitive "ears" in detecting, amplifying and reporting sounds by both visible and audible signals . . . even directing guards to actual zone of disturbance. A.A.I. Automatic Alarms trap the intruder not after but BEFORE he has accomplished his nefarious errand. Here is modern protection at its best . . . an alarm system relatively low in cost that operates with unfailing accuracy, multiplying, many times, the efficiency of human guards in patrolling miles of high wire fence, even during the hazardous moments of blackout, storm and fog. Surround your industry with this security.

Licensed under DuPont and Astatic Patents

Explanatory Literature is Available upon Request

AUTOMATIC ALARMS Incorporated

831 Market St. YOUNGSTOWN, OHIO, U. S. A.

shipyards, buoys, and other water traffic control devices, etc., should carry this allocation symbol.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

The responsibility for placing the allocation symbol on the order rests with the shipping company, ship builder, or other agency originating the order.

10.50—Air Transportation

All orders for material, equipment and supplies necessary for the manufacture of airplanes other than those approved by the Joint Aircraft Committee; orders for repair, maintenance and operating supplies needed to maintain air transportation and airports, airlane markers, other air traffic control and safety devices should bear this allocation symbol.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

The responsibility for placing the allocation symbol on orders rests with the airline, with the manufacturer in the case of private planes or with the government agency which originates the order.

10.90—All Other Transportation

Manufacturers of other means of transportation such as motorcycles, bicycles, wagons, etc., should place this allocation symbol on all orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 11.00—Communication
11.10—Telephone

Orders for all apparatus and equipment necessary to provide and maintain telephone service, and supplementary related services furnished by the telephone companies, and all orders for the repair, maintenance and operating supplies for furnishing telephone service should bear this allocation symbol.

Orders for material for the construction, maintenance and repair of central office and other buildings should not be given this symbol, but should be placed in class 21.00 and 22.00.

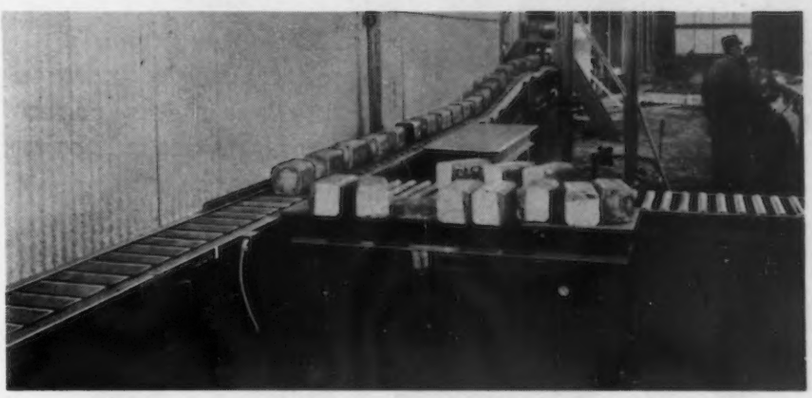
All orders placed by the manufacturers of telephone equipment should also carry this allocation symbol.

11.20—Radio

This allocation symbol should be placed on all orders for materials, supplies and equipment for commercial radio equipment, both by those operating radio stations and systems and those engaged in the manufacture of the equipment. Orders for materials, etc., going into home, portable and automobile radio equipment should not be given this symbol but that for equipment and supplies for household use—class 16.00.

Construction of new buildings and building maintenance and repair should not be included in this

AN APRON FULL OF SHELLS FOR UNCLE SAM!



THIS Alvey-Ferguson *Apron* Conveyor installation carries billets from shearing machine to the furnace, where they are turned into rough forgings ready to be machined into the shells which Uncle Sam needs to win this war.

Ruggedly built to withstand terrific wear, the aprons are made of channel carried on roller chains, with a cover angle over the top of the chains so that the top of the channel and the angle iron frame are flush. This makes it easy to slide the billets over the cover angle onto the channel aprons of the apron conveyor.

At various stages of production the conveyor carries the billets at elevations most convenient to the operators of the furnace, and various forging machines.

Whatever *your* material handling or product movement problem, we can solve it with an A-F Conveyor installation. Write, wire or phone, without obligation on your part, for a consultation. The Alvey-Ferguson Co., 741 Disney St., Cincinnati, O.

CONVEYING MACHINERY A-F

ALVEY-FERGUSON *Conveyors*

AND PRODUCT WASHING MACHINES

classification (see classes 21.00 and 22.00).

11.30—Telegraph

All public telegraph companies should place this symbol on orders for all apparatus and equipment necessary to provide and maintain telegraph service and on orders for the repair, maintenance and operating supplies for furnishing telegraph service.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

11.90—All Other Communication

Manufacturers of all other means of communication such as loud speaker or buzzer systems, etc., should use this allocation symbol on all purchase orders that they issue.

Signal systems such as rockets, flares, signal flags, sirens, bells, and beacons are not included in this classification and purchase orders in regard to them should be given the allocation symbol of the customer.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 12.00—Public Health and Safety

12.10—Sanitary Systems and Facilities

This allocation symbol should be placed on all orders for materials, equipment, supplies, etc., for water systems, sewage systems, garbage disposal plants, etc.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

12.20—Health Equipment and Supplies including Personal Care

Manufacturers of hospital and doctors' supplies, drugs and medicines, dental equipment, surgical instruments, X-ray equipment, toilet preparations, soap, etc., should place this allocation symbol on all purchase orders issued.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

12.30—Public Safety Equipment and Supplies

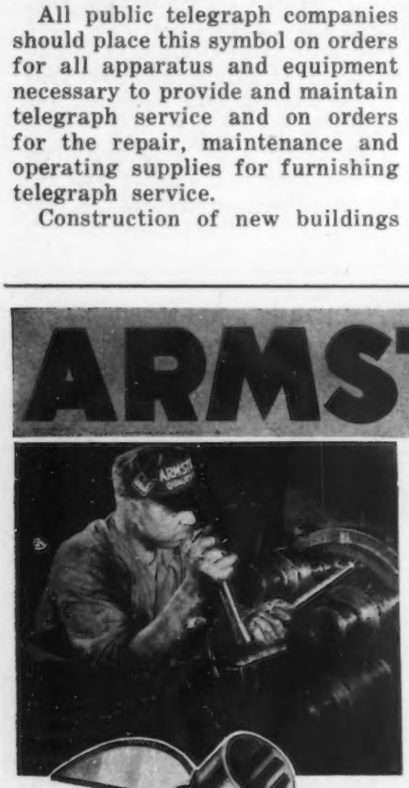
Manufacturers of police and fire equipment, fire alarm equipment, non-military gas masks, sirens, decontamination equipment, for civilian use, fire extinguishers, etc., should use this allocation symbol on all purchase orders that they issue. State and local police and fire authorities will also place this allocation symbol on all purchase orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 13.00—Agricultural Equipment and Specialized Agricultural Supplies

Manufacturers of agricultural implements, tools, equipment, machinery, feeding stuffs, fertilizer, fungicides, insecticides, etc., used on farms and in the care of live-

ARMSTRONG



Drop Forged Wrenches

For industrial use and wherever quality counts ARMSTRONG WRENCHES are preferred for their extra strength, improved designs, finer steels, correct heat treatment, accurate openings and better balance.

Over 100 types, each in all sizes. Drop Forged Carbon and Chrome Vanadium Steel Open End and Box Socket Wrenches . . . Chrome Vanadium Detachable Head Socket and Hollow Screw Wrenches . . . Great Construction Ratchets . . . Special Wrenches of all types on short notice—standardize on "ARMSTRONG WRENCHES" they are the finest obtainable.

Write for Catalog Co-39

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

309 N. Francisco Ave., Chicago, U.S.A.

Eastern Warehouse and Sales: 199 Lafayette St., N. Y.

Buy ARMSTRONG TOOLS from your Supply House

ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

stock, poultry, bees, nurseries should place this allocation symbol on all purchase orders that they issue.

This symbol should not be applied, however, to orders for materials for the construction of new buildings or building maintenance and repair (see classes 21.00 and 22.00).

Class 14.00—Industrial Food Processing

Industrial food processors such as bakeries, canners, candy makers, packers, soft drink makers, tobacco and cigarette companies, etc., should use this allocation symbol on all purchase orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 15.00—Wearing Apparel

Manufacturers of all types of non-military wearing apparel including footwear, hats, gloves, and work clothes of all types should place this allocation symbol on all purchase orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Army Purchasing Millions of Buckles, Snaps, Hooks, etc.

• • • **Numerous hardware items,** small in themselves but aggregating millions and indispensable to the war effort, are being purchased by the Quartermaster Corps, according to the War Department. Recent contracts awarded at the Jeffersonville Quartermaster Depot, Jeffersonville, Ind., include:

21,860,386 galvanized steel wire slips, distributed among six firms in Illinois, Ohio, Indiana and Michigan.

23,500,000 malleable iron or steel 1 in. snaps, distributed among eight firms in Illinois, Indiana, Ohio and Connecticut.

140,080,000 .046 in. legging hooks awarded to a Massachusetts manufacturer.

4,675,747 double malleable iron or steel hooks, distributed among three firms in Connecticut, Massachusetts and New Jersey.

4,810,627 double brass hooks, distributed among three concerns in Connecticut, Massachusetts and New York.

8,000,000 malleable iron or steel loop strips awarded to two firms in Connecticut.

7,620,000 galvanized malleable iron rings in ½ in., ¾ in. and 1 in. sizes awarded to an Ohio manufacturer.

11,000,000 malleable or steel wire rings .7 x .38 in., awarded to three concerns in New York and Connecticut.

3,157,875 malleable iron or steel wire rings .78 x .65 in., awarded to two firms in Connecticut.

500,000 malleable iron or steel wire rings 1 x .875 in., awarded to a Connecticut concern.

7,161,550 zinc base die casting rings .7 x .38 in., awarded to two firms in New York and Illinois.

18,500,000 zinc base die casting rings ½ in., awarded to two firms in New York and Illinois.

9,100,000 zinc base die casting rings ¾ in., awarded to two firms in New York and Illinois.

2,000,000 zinc base die casting rings 1 x .875 in., awarded to a New York firm.

38,700 1 in. tongueless buckles, distributed among 19 firms in New York, New Jersey, Illinois, Connecticut, Rhode Island, Massachusetts, Ohio and Michigan.

904,500 1½ in. tongueless buckles, awarded to a New Jersey firm.

3,442,150 2 in. tongueless buckles, awarded to three firms in Illinois, Connecticut and New Jersey.

22,660,090 ⅝ in. tongueless buckles, distributed among 16 firms in New Jersey, New York, Illinois, Michigan, Connecticut and Massachusetts.

9,480,000 1 in. end buckles, distributed among 8 firms in Iowa, Connecticut, New Jersey and Illinois.

16,480,000 .018 in. eyelets awarded to a Massachusetts firm.

346,080,000 .0145 in. eyelets awarded to a Massachusetts firm.

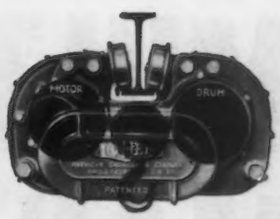
140,080,000 .012 in. eyelets awarded to a Massachusetts firm.

AMERICAN ENGINEERING COMPANY

The Lo-Hed Hoist Is Applicable To Any Monorail System. There's A Balanced Lo-Hed Electric Hoist For Every Purpose

Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative

OTHER A-E-CO PRODUCTS:
TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER



And it's easy to see why BALANCE is important in an electric hoist

The other day our hoist engineer said to us: "In our advertisements we've talked a lot about the balanced design of the Lo-Hed hoist, how it achieves minimum headroom (for which no premium is charged), and allows us to use an efficient all-spur gear drive.

"I think we ought to tell people that balancing the motor and drum about the beam also enables us to design short, strong shafts that minimize torsional stresses and reduce the chances of failure. We might also say that the unique balanced construction of the Lo-Hed hoist permits the use of covers that can be removed with a screw driver to gain access to the motor, brake, cable or drum . . . good points in these times.

"And don't forget that though more Lo-Heds are built today than ever before they are as carefully precision-machined as they were in normal times. A Lo-Hed bought now for war work is an investment in the future." All right, Mr. Engineer, since you've said it all for us, we'll sign off by simply asking the reader of this ad to send in for his copy of the Lo-Hed catalog.

AMERICAN ENGINEERING COMPANY
2410 Aramingo Avenue, Philadelphia, Pa.

☐ Please send me your complete catalog of LO-HED HOISTS

☐ Ask your representative to get in touch with me promptly

Name .....

Company .....

Street Address .....

City ..... State .....

(Please Print Plainly)

Army Announces Awards for Four Construction Projects

• • • **The War Department** announced June 3:

Authorization for the construction of a manufacturing plant in Illinois, to cost in excess of $3,000,000. Construction will be supervised by the Chicago district office of the Corps of Engineers.

Authorization for the construction of a cantonment at Salina, Kan., to cost in excess of $3,000,000. Construction will be supervised by the Kansas City district office of the Corps of Engineers. A contract for construction-management service has been awarded G. L. Tarlton, Contractor, Inc., and the MacDonald Construction Co., St. Louis. A contract for architectural-engineering service has been awarded Wyatt C. Hedrick, Fort Worth, Texas.

Negotiations of a letter of intent with E. I. du Pont de Nemours & Co., Wilmington, Del., for the design and operation of a manufacturing plant in Nebraska, to cost in excess of $3,000,000. Construction will be supervised by the Omaha district office of the Corps of Engineers.

Authorization for an expansion to Kelly Field, Texas, to cost in excess of $3,000,000. Construction will be supervised by the San Antonio district office of the Corps of Engineers.

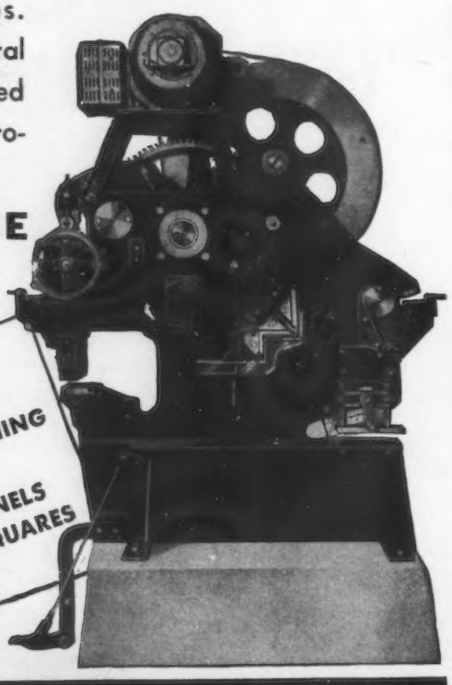
Oil Refinery Scrapped For Lack of Pipe Line

Great Bend, Kan.

• • • **Because it was off the regular pipe line routes and is unable to get crude oil, the Plains Oil & Refining Co.'s oil refinery located in the heart of Kansas' richest oil field, is being dismantled for scrap. With the war, hope of saving the foundry by building a pipe line was given up.**

MULTIPLYING MAN POWER

With "Buffalo" Universal Iron Workers on the job the production of every man-hour reaches new peaks. These versatile machines are brutes for punishment, easy to operate, built to handle the toughest assignments on continuous day-and-night schedules. Here's modern speed in metal working — and with marked savings in every unit produced!



BUFFALO FORGE COMPANY

492 Broadway, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

for PUNCHING . . SHEARING SLITTING . . COPING . . NOTCHING of ANGLES . . TEES . . CHANNELS I-BEAMS . . ROUNDS . . SQUARES FLATS . . PLATES

"Buffalo" UNIVERSAL IRON WORKERS

Ryerson to Stock New NE National Emergency Alloy Steel

• • • **Joseph T. Ryerson & Son, Inc.,** has added to its warehouse stocks the new NE (National Emergency) low alloy steels, established by the WPB to help conserve nickel, chromium, vanadium, etc., for the duration. Ryerson has planned a representative stock of hot rolled rounds in sizes ranging from ½ to 7 in. in diameter and in six different analyses. Heretofore, these new steels have not been available for experimentation and it has been difficult to secure even small lots necessary for determining the suitability of the steels for an application.

Exact distribution among the Ryerson plants is not yet decided, but initial stocks will consist of six analyses: (1) carburizing alloys, NE 4023 and NE 8620; (2) medium hardening alloys, NE 4042 and NE 8744; and (3) high hardening alloys, NE 4047 and NE 8749. It is confidently believed that these new alloys, properly selected and heat treated, will satisfactorily replace the higher alloy content steels formerly used, except in very special applications.

The metallurgical section of the WPB is very anxious to know how the new NE steels will do the job and conserve scarce metals. Therefore, all users are urgently requested to report details of each operation such as forging, machining, heat treatment response, etc., as well as the results of tests, so that this information can be made available to others.

While at the present time only limited heat treating data is available, Ryerson will furnish all possible information with each order to give users as much help as possible.

Tin Plate Curtailment By September Predicted

Pittsburgh

• • • **Tin plate production** is expected to be curtailed sharply around the first of September, with the major portion of production at that time earmarked for lend-lease and special domestic requirements. So many general line can items have been stopped that requirements from those sources will be negligible.

Production of black plate for tinning on some wide strip mills is expected to proceed at top levels of production through the month of August in order that enough tin plate will be processed to take care of final packing requirements and any emergencies which might arise. During the balance of the year, tin plate production on at least two wide continuous mills may be curtailed so much as to be negligible relative to total tonnage of flat rolled products coming off these mills. Any tin plate requirements which may not be met by some companies because of increased ship plate production may be redistributed to other tin plate makers.

Can makers now are using up substantially all tin plate being made by producers.

C-I Stops Making Tin Plate At Its Shenango Works

Pittsburgh

• • • **Effective June 13,** Carnegie-Illinois Steel Corp. will discontinue the production of hot rolled tin plate at the company's Shenango works, New Castle, Pa. Black pickling, annealing, and cold rolling departments will finish up as they complete processing of the final hot rolled production. The tinning department will continue to operate on whatever tonnage of black plate from other company plants is permitted under the monthly pig tin allotment.

This suspension of operations is due to a variety of factors, among which are the lack of necessity for hot rolled tin plate products, since cold reduced tin plate facilities will be able to take care of requirements, the conservation of pig tin by use of electrolytic tin plating lines, and an anticipated drop in overall tin plate production within the next few months. It is recalled by the company that the plant was opened on a purely temporary basis in June, 1941, after having been shut down late in 1939. The resumption of operations in 1941 was the result of heavy lend-lease requirements for tin plate superimposed upon a tremendous domestic consumption.

Porter Co. Plans New Plant

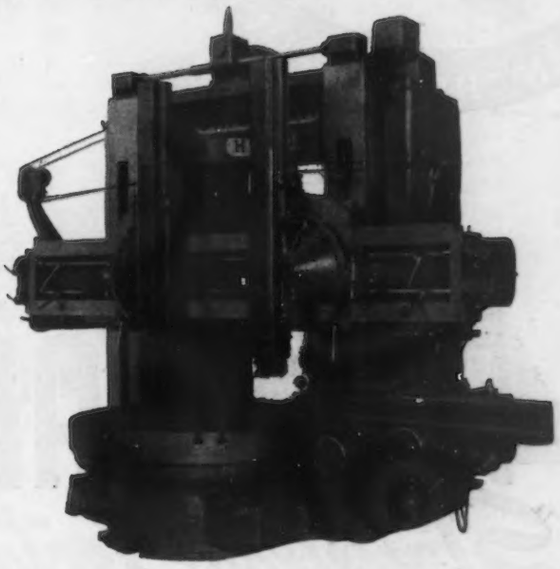
Pittsburgh

• • • **H. K. Porter Co.** plans to open a plant in Blairsville, Pa., expanding its facilities in the war effort, according to T. M. Evans, president. The company's regular products include locomotives and chemical processing equipment. Between 150 and 200 men are to be employed in the new plant.

Cincinnati

SPIRAL BEVEL GEARED

HYPRO VERTICAL BORING MILLS



Engineered to combine speed, flexibility and ease of control with power, rigidity and accuracy to meet the requirements of today.

Designed for:

1. Centralized Pendant Station Control which provides operation of the entire machine from the operator's position.
2. Individual feed and rapid traverse boxes with independent Rapid Traverse Motors for each head, making it possible to control each head independent of the other.
3. Automatic lubrication provided to all feed boxes, table drive, heads and saddles requiring no attention on the part of the operator.

In these competitive times, you need this kind of equipment. Full particulars sent upon written request.

Sizes—54", 64", 72", 84", 100", 120", 144".

PLANERS · PLANER MILLERS · BORING MILLS

THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

N.I.A.A. War Conference Will Commence June 29

• • • **The N.I.A.A.** War Conference has been advanced to June 29, 30 and July 1, at the Traymore, in Atlantic City. Main subjects with authorities on each include: War production drives; salvage and conservation drives; labor-management organization; training in industry; wartime advertising that counts, and post war planning.

Freight Car Curtailment Forces Shops to Suspend

Pittsburgh

• • • **According to** reliable sources. WPB's limitation moves on freight car production has resulted in the suspension of approximately 38,000 freight cars which represented business on order over and above the 45,000 freight cars approved by WPB and the additional 18,000 which, as far as possible, are to be made from inventories at car building plants. Freight car curtailment, it is said, resulted in the shutting down several weeks ago of New York Central's dispatch shops at Rochester, N. Y., and Pullman Standard Mfg. Co.'s shop at Bessemer, Ala.

The urgency of the iron ore situation has resulted in 2000 ore cars being granted A-1-a priority assistance. The Duluth, Missabi, & Iron Range Railroad has ordered 1500 75-ton ore cars, 500 of which will be built by General American Transportation Corp., 500 by Pullman Standard Car Mfg. Co. at Michigan City, and 500 by American Car & Foundry Co. at Huntington, W. Va. The Great Northern Railroad has ordered 500 75-ton ore cars from the Bethlehem Steel Co.

ARMORARC
Stainless Electrodes

Armor plate for military airplanes . . . armor plate for tanks and combat cars . . . armor plate for warships and cruisers . . . thousands of tons of armor plate that must stand up under the Axis' mightiest blows. That's where Alloy Rods' new ARMORARC Stainless Electrodes join the fight . . . because ready-for-action ARMORARC rods have the tough physical properties *imperative* for ALL types of armor plate welding.

Uniform ARMORARC provides a more perfect weld. It assures the welder of *low splatter loss . . . easily removed slag . . . welds that do not crack.*

So—when we say ARMORARC welds "can take it"—we add new meaning to democracy's pledge for "*All Out* war production."

Alloy Rods Company manufactures *exclusively* stainless steel electrodes (Arcaloy) of all analyses.

ALLOY RODS COMPANY, YORK, PA.
STAINLESS STEEL ELECTRODES

Car Building Restrictions Cut Buffalo Foundry Output

Buffalo

• • • **Government** restrictions on the building of new railroad cars resulted in a sharp curtailment in operations at two large Buffalo foundries, since car wheel output is limited to replacements. Other foundries, working on air brakes, found a large portion of their business cancelled by the government's action. Foundries turning out castings needed for other parts of new freight cars also have dropped back from capacity operations. Some of the plants affected may find it difficult to change over production facilities to some other line of war work.

Construction Bureau Moved From Washington to New York

• • • **The Bureau of Construction,** recently established to coordinate all WPB construction functions, has moved from Washington to the Empire State building, New York. Thomas L. Peyton will be in charge of a small liaison force remaining in Washington.

The bureau, under William V. Kahler, is divided into five operating branches, including a Project Analysis Branch, handling applications for private construction and administering limitation and conservation orders; and a Materials Control Branch, reviewing the use of materials in projects.

Aluminum Co. of Canada Planning Several New Plants

Toronto

• • • **Aluminum Co. of Canada,** Ltd., with head office in the Sun Life Building, Montreal, has announced plans whereby it will immediately proceed with construction of new plants and additions in various parts of Canada representing expenditure of approximately $15,000,000. In addition to supplying aluminum, aluminum castings, etc., for Canada's war program, the company some time ago received contracts from the United States in excess of $100,000,000 at which time it was announced that the company would extend production facilities in the Dominion at a cost of about $60,000,000.

According to reports during the past week, Aluminum Co. of Canada, Ltd., has conferred with municipal officials of a small city in Quebec with regard to the construction of a $3,000,000 plant there in connection with which work will be started within a month. The plant will contain two pot rooms. The company also is engaged in installing a number of additional pot rooms at another Quebec plant and has just awarded contract for construction of still another new Quebec plant.

In addition to the above, officials of the company announced that arrangements had been completed for the construction of a new plant near Toronto, which would cost about $1,000,000.

3 High Speed Strip Mills Exclusively on Plates Now

Pittsburgh

• • • **At least three and** perhaps more wide strip mills in the country have been cleared of practically all sheet tonnage, with available capacity being pegged for rolling plates, which are under mandatory control. Some tin plate coils are being rolled but the tonnage involved is relatively small compared with total tonnage produced on the units. Pushing off sheet orders has created a serious condition with respect to a substantial amount of sheet business now on the order books of mills which can roll nothing but plates.

Relatives of Service Men Cut Shop Absenteeism

Cleveland

• • • **Shop committees** formed by workers whose brothers or sons are in the armed forces are largely responsible for cutting down absenteeism 25 per cent in the National Acme Co. plant here. Nevertheless, absenteeism continues a major problem and company officials estimate that some 5000 hours weekly are lost because of this. Absences are not confined to a small portion of the employees, but apparently are indulged in from time to time by the majority of the workers, usually on Monday or Saturday. Although this problem is being faced by many defense plants today, National Acme has been aggressively attempting to check this time wastage and has included among its tactics the listing of attendance of various employees on its bulletin boards, so that other workers will be notified of the absences of their fellows.

The company has 4000 employees, and about 200 of these take a day off a week, on the average. This occurs despite the fact that three shift operations are only on a 6-day basis. Meanwhile, the company is busily engaged in training new employees to staff its new plant, expected to be completed some time in July. It will probably require approximately 1200 additional employees, and these will be trained by the company, largely from inexperienced workers.

Present monthly output of the company is 6 2/3 times its normal peacetime output of machine tools, and does not include special work being performed in connection with the war effort.

WPB's Finance Bureau Aids 429 Firms in May

• • • **The Bureau of Finance** of WPB reported June 5 that in May it assisted manufacturers engaged in war production to obtain $54,476,358 of financing from local banks, Federal Reserve Banks, the RFC, the Army, Navy, Maritime Commission and other public and private agencies. This compared with $55,109,966 in the preceding month. This financing was utilized by 429 companies throughout the country, compared with 289 companies in April.

"Look, Miss Jones, You don't have to bother signaling when you turn left!"

Policy Committee Named for War Manpower Commission

• • • **The Management-Labor** Policy Committee of the War Manpower Commission, to be composed of seven national labor leaders and seven leaders of war production and transportation management, was set up on Monday by Commission Chairman Paul V. McNutt.

The committee held its first meeting on Tuesday to discuss basic policies and immediate problems. Meetings are planned to be held weekly, on Tuesdays. The commission meets on Wednesdays.

Chairman McNutt announced that the Policy Committee, as well as the Commission itself, would be consulted on all major questions.

The order authorizes the committee "to consider and recommend to the chairman, matters of major policy concerning the activities and responsibilities of the commission." The order also directs the committee to make studies on its own motion, and to initiate the formulation of manpower policies, in addition to considering policies referred to it by the chairman.

Those who thus far have accepted membership on the policy committee, and their organizations, are:

REPRESENTING MANAGEMENT—R. Conrad Cooper, assistant vice president, Wheeling Steel Corp.; H. A. Enochs, chief of personnel, Pennsylvania Railroad; R. E. Gillmor, president, Sperry Gyroscope Co., Inc.; R. Randall Irwin, director of industrial relations, Lockheed Aircraft Corp.; C. J. Whipple, president, Hibbard, Spencer, Bartlett & Co.

REPRESENTING LABOR—Frank P. Fenton, AFL; John P. Frey, AFL; George Masterson, AFL; Clinton Golden, CIO; John Green, CIO; Walter P. Reuther, CIO.

McSherry Guides Operations Of Manpower Commission

• • • **Appointment of** Brigadier Gen. Frank J. McSherry as director of operations of the War Manpower Commission was announced June 2 by Commission Chairman Paul V. McNutt. Gen. McSherry, 49, a native of Missouri, has been working on labor supply and training problems for several years.

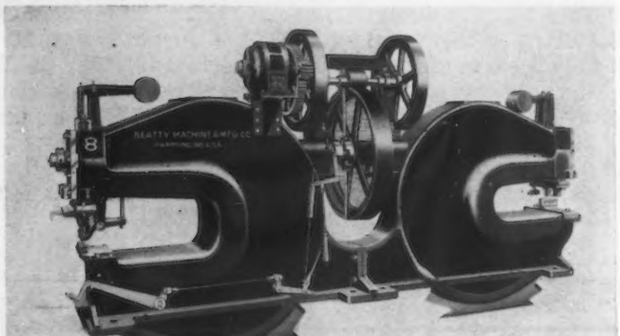
Rubber Coordinator

• • • **Alden C. Brett,** treasurer and comptroller of Hood Rubber Co., Watertown, Mass., has been appointed WPB deputy coordinator for rubber, it was announced June 2 by Coordinator Arthur B. Newhall.

Tucker Gets New Post

• • • **Joe M. Tucker** has been appointed WPB representative to the Board of Economic Warfare. He replaces Edgar B. Stern, who was recently named chairman of the War Production Board Transportation Committee.

"SIAMESE TWINS" Doing Double Duty



This BEATTY Double End Punch conserves floor space, reduces man power required for operation. Machines are timed to punch alternately. Machine is available with plain table or architectural type table at either or both ends . . . interchangeable tools provide punching or shearing on either or both ends. Available in a full range of throat depths. Widely used in the shipbuilding, tank, railroad, and aircraft industries. This model is one of a complete line of Detail Punches, Single End Punches and Shears, Beam Punches, Flush Front Shears, Horizontal Punches and Heavy Duty Plate Shears. If you have a heavy metal fabrication problem, call in a Beatty engineer.

BEFORE YOU BUY SEE BEATTY FIRST

Illustrating, left to right: 1. Beatty Hydraulic Brake and Flanging Machine. 2. Self-Contained Hydraulic Press. 3. Extruding Press. All are available in a complete range of sizes. Write for bulletins.

BEATTY MACHINE & MFG. COMPANY HAMMOND, INDIANA

COMING EVENTS

June 21 to 25 — American Water Works Association, Chicago.
Aug. 23 to 30—National Association of Power Engineers, New Orleans.
Sept. 1 to 11—Building and Construction Trades Council, Atlantic City, N. J.
Oct. 5 to 9—National Safety Congress Association, International convention, Baltimore.
Oct. 12 to 16—National Metal Congress and Exposition, Cleveland.
Nov. 30 to Dec. 5—National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

May Heavy Construction Awards Hit All-Time High

• • • **May heavy** engineering construction totals eclipsed all previous monthly records with a volume of $1,044,572,000 for the four week month according to the *Engineering News-Record*. Averaging $261,143,000 for each of the four weeks, the total is a 37 per cent increase over the previous record average reported for the five weeks of July, 1941, and a gain of 45 per cent over the five-week, April, 1942, average.

More than 95 per cent of the May construction was public work, totaling $995,247,000 and up 49 per cent from the previous month. Private engineering construction averaged $12,331,000 per week, a decrease of 3 per cent from April. The total May private engineering construction was $49,325,000.

Steel Tubing Users Asked To Conserve Where Possible

Washington

• • • **Users of steel tubing** were asked Monday by Reese H. Taylor, chief of the WPB Iron and Steel Branch, to limit their consumption of cold drawn seamless tubing to those operations where no substitute is possible. Mr. Taylor said that substitutes are available and satisfactory for a number of purposes and asked that hot rolled seamless, and electrically, gas, lap, or butt welded tubing be used wherever possible.

Unless large scale voluntary action is successful, Mr. Taylor said in his letter, drastic regulatory action will be taken.

Plants in Wisconsin And Tennessee Approved

• • • **The War Department** announced June 6:

1. Award of a contract to the F. & Y. Construction Co., Columbus, Ohio, for construction-management service, in connection with a depot warehouse in Ohio. Construction will be supervised by the Columbus district office of the Corps of Engineers.

2. Authorization for the construction of a manufacturing plant in Wisconsin, to cost in excess of $3,000,000. Construction will be supervised by the Milwaukee district office of the Corps of Engineers. In connection with this project, a letter of intent was signed jointly with Charles T. Main, Inc., of Boston, and Frazier-Brace Engineering Corp. of New York, for architectural - engineering - management service.

3. Authorization for the construction of a manufacturing plant in Tennessee, to cost in excess of $3,000,000. Construction will be supervised by the Corps of Engineers, Cincinnati.

4. Authorization for the construction of a depot warehouse at Toledo, Ohio, to cost in excess of $3,000,000. Construction will be supervised by the Columbus district office of the Corps of Engineers.

5. Authorization for the construction of a depot warehouse at Stockton, Calif., to cost in excess of $3,000,000.

6. Authorization for the construction of a depot warehouse at Springfield, Ill., to cost in excess of $3,000,000.

A TINY DIE HEAD THAT DOES A BIG JOB!

(Actual size)

STYLE EJ5 SOLID ADJUSTABLE DIE HEAD

Don't waste time picking the right solid die to get the accuracy you want on small diameter, fine pitch threads.

Specify the EJ5 Solid Adjustable!

The Chasers can be adjusted to cut within close tolerances . . . Can be easily removed for resharpening or replacement.

Cuts threads 1/16″ to 3/16″ in diameter, in pitches as fine as 100 per inch.

Send for our EJ5 Booklet.

THE GEOMETRIC TOOL COMPANY
New Haven, Conn.

pressure-proof!

CONSERVE machine efficiency! *Babbitt-tipped* Laminum shims, for pressure-lubricated systems, prevent oil and pressure losses. Body of shim retains all Laminum features of quick precision adjustment by *peeling* . . . in factory assembly or field service.

The .003 or .002 in. laminations are bonded into a solid unit . . . easy to peel.

Laminum shims are cut to your specifications. For repairs or maintenance, get stock shim materials from mill supply dealers. (Write us for illustrated shim application file-folder and Laminum sample.)

Laminated Shim Company
Incorporated
76 Union Street Glenbrook, Conn.

it's LAMINUM
THE SOLID SHIM THAT peels FOR ADJUSTMENT

Break in March Price Ceiling Attracts Wide Attention

• • • A series of interesting price developments late last week in fields apart from the metals and metalworking industries drew the attention of executives who have been following the government's control efforts and watching the pressure bulge several ceilings.

The first break in the widely applied March ceiling was made by OPA under Maximum Price Regulation No. 157 covering sales and fabrication of apparel and related items for military purposes. This regulation permits contractors to add to their highest contract price up to April 1 any increase in material or labor cost factors from the date on which the contract was placed to March 31, 1942; and it also permits the addition to the contractors' ceiling of labor cost increases from March 31 to April 27. Labor cost factors were liberalized.

The reason this development is important is that it holds possibilities of foreshadowing action in other fields, particularly machines and parts for military equipment.

Other events included:

Inauguration of a subsidy program in regard to scrap rubber. A flat price of $25 per ton will be paid for carload lots of "run of mine scrap and worn-out tires," anywhere in the nation. Rubber Reserve Corp. will execute the program under direction of Jesse Jones. This is one more step in the subsidy program, assuming wider proportions now.

Decision by oil companies supplying the eastern seaboard to press for price increases in view of rising transportation charges.

Formation of a large squad of

New Quantity Setup Feature of Bolt Order

• • • **One feature** of the new OPA price schedule No. 147 covering bolts, nuts, screws and rivets (THE IRON AGE, May 28, pages 107-109) is the quantity extra setup, reproduced in the table below. Examination of the 55-page price order discloses that outside of the fact cap screws discounts were set back, the schedule in general conforms with the pricing practice of the industry in recent months.

On the quantity matter, most sellers had been using case quantities as the basis for extras, or in the event of specials, the setup cost was a factor.

The new price order states that an additional charge of $10 may be added to the maximum prices for each type, size and specification "on sales not in excess of the following quantities of each such type, size and specification, produced by the selling producer and neither sold from stock nor customarily carried by such producer as a stock item at the time of shipment."

	Domestic (Pieces)	Export (Pieces)
Stove Bolts, Wood Screws and Machine Screws	25,000	25,000
Sheet Metal Screws	50,000	50,000
All Other Bolts and Screws		
1/2 in. x 6 in. and smaller	15,000	15,000
9/16 in. through 3/4 in. diameter through 6 in. long	10,000	10,000
7/8 in. through 1 1/4 in. diameter through 12 in. long	3,000	3,000
Any diameter through 1 1/4 in. longer than 6 in. through 12 in.	1,000	1,000
Any diameter through 1 1/4 in. longer than 12 in.	1,500	500
Nuts		
1/4 in. diameter and smaller	50,000	50,000
5/16 in. diameter through 3/8 in.	25,000	25,000
7/16 in. diameter through 9/16 in.	10,000	10,000
5/8 in. diameter through 3/4 in.	5,000	5,000
7/8 in. diameter through 1 3/8 in.	1,000	1,000
1 1/2 in. diameter and larger	250	250

several hundred trained investigators to check retailer compliance with OPA regulations in the East.

Indictment of six powder making concerns and ten officials on a charge of conspiring to fix prices on commercial explosives and blasting supplies. The indictment charges the defendants entered upon the alleged conspiracy in 1938 and until now have "engaged continually and in an unlawful combination to fix and maintain arbitrary, artificial and non-competitive prices and terms."

Meanwhile, warnings continued to come from industrialists that price ceilings cannot be held if elements making up those prices are free. Fred Lazarus, Jr., Columbus, Ohio, executive, speaking in New York, asserted that OPA had been advised repeatedly that "everything that makes price ceilings must be frozen if ceilings are to stand."

Relief for Exporters

• • • **The choice** of the base period fixing exporters' margins under the maximum export price regulation has made it difficult for a number of exporters who were forced to cut margins to meet dumping by the Axis in South America. The regulation provides that the export price shall be the cost of acquisition by the exporter plus the average premium charged in the export trade on a similar transaction between July 1-Dec. 31, 1940, or between March 1-April 15, 1942, whichever yields the lower average premium. Addition of insurance charges, fees, shipping rates, etc., is permitted.

On June 5, OPA announced maximum export premiums that may be charged in the sale of finished textile piece goods, at 6 to 8½ per cent of the domestic premium price, supplanting the base period margins. It is expected similar relief will be granted for other commodities where similar conditions apply. Specific premiums will be applied where the margin during the base period does not yield a normal return.

War Model Bicycle Prices

• • • **Regulation No. 158** has been issued covering the "war model" bicycle. In the East, the highest retail price that a dealer may charge is $32.50; in the middle zone it is $33.50 and in the far West zone $34.50. There is a special provision for sales by mail order. The maximum price in such instances is $29.50 f.o.b. the seller's usual point of shipment in the East; $30.50 in the middle zone and $31.50 in the Far West. Sales or use taxes may be added.

Miscellaneous Price Rulings

• • • **Maximum prices** at which Edison General Electric Co. of Chicago may sell to distributors its 1942 line of Hotpoint refrigerators are set in Order No. 1 to Revised Price Schedule No. 102, issued June 6. Prices at which Newark Stove Co., Newark, Ohio, may sell two models of private brand gas ranges to Phillips Pe-

KNOX SPEAKS: Secretary of the Navy Frank Knox makes the presentation address at the Navy "E" award exercises recently held at the Fore River Yard of Bethlehem Steel Co.'s shipbuilding division.

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Sharpens Drills 2 and 3 Flute, Straight or Taper Shank. Sizes from ⅛ to 1½ inch. Other combinations available.

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troleum Co., Detroit, are established in Order No. 3 under Revised Price Schedule 64.

Several coal mines were granted upward adjustments in maximum prices last week by OPA, and permission was granted for the continuance of certain sales to the New Haven Railroad of bituminous coal at maximum prices established for commercial users, when the fuel is used for generating electricity.

The government cannot violate its own price ceilings, according to a ruling by L. C. Warren, controller general, on June 5. He required government departments to make refunds in several instances in which the government had accepted bids over the maximum levels, particularly scrap.

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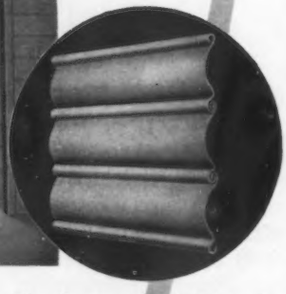

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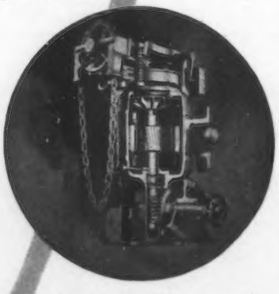

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Steel Warehouse Prices

• • • **The steel warehouse** price order (No. 49) is still being worked over in Washington, according to reports late last week. OPA is aiming at bringing out its own list of prices eventually, supplanting the present setup based on schedules of leading sellers.

An increasingly large amount of distress inventories is reported being placed upon the market by companies formerly producing nonessential materials. Most of these concerns are attempting to market their stocks at the price paid for them, plus freight, but it is feared that some of this semi-processed steel will not be marketable. Meanwhile, it is reported that the Government may eventually take over all such "frozen" inventories, at their purchase prices with funds to be secured from the Metals Reserve Corp. It is believed that when this is done, all this steel may be listed in orderly fashion, and it may be stored in Government owned warehouses. It should be noted that the Government already has established one warehouse in up-state New York to service New England war plants.

Wire Maker Denied Aid

Washington

• • • **Northwestern** Steel & Wire Co., Sterling, Ill., on Tuesday was denied permission by OPA to charge higher than maximum prices contained in Price Schedule No. 6 for low carbon wire products. The denial was explained because the company's general profits position was said to be "extremely favorable."

Northwestern had alleged that it was the only electric furnace producer of low carbon wire products and the cost of its steel was $6 to $8 higher than that produced by open hearth and bessemer methods.

Foundry Books Examined

• • • **Several foundries** around New York have had their books examined closely recently by compliance officials, who conducted an exhaustive study of prices paid for materials and prices of cast-

ings produced. In some cases, even customers of the foundries were interviewed.

Somers Heads OPA Group On Cold Drawn Bar Prices

Washington

• • • **President** Joseph T. Somers of the Wyckoff Drawn Steel Co., Pittsburgh, has been elected chairman of OPA's Cold Finished Bar Committee, one of four iron and steel industry advisory units created last month to serve as liaison groups between OPA and the industry on any problems which may arise with respect to prices.

Other members of the Cold Finished Bar Advisory group are: W. R. Howell, Bliss & Laughlin, Inc., Harvey, Ill.; T. K. Kelby, LaSalle Steel Co., Chicago; V. A. Jevon, Jones & Laughlin Steel Corp., Pittsburgh; W. N. Lynch, Keystone Drawn Steel Co., Spring City, Pa.; E. L. Parker, Columbia Steel & Shafting Co., Pittsburgh, and F. C. Young, Union Drawn Steel Division, Republic Steel Corp., Massillon, Ohio.

The group, in keeping with the terms of the Price Control Act of 1942, is purely advisory.

Used Steel Pail Prices

• • • **Ceiling prices** for used steel paint pails of two, three and five-gallon capacity were announced last week. The prices were issued in Revised Schedule No. 43, as amended, which formerly covered only used steel drums.

Also, in Revised Price Schedule No. 43, as amended, certain deductions have been made from the maximum prices established for reconditioned drums. The new maximum prices established by Revised Price Schedule No. 43, as amended, become effective June 10, 1942.

OPA set up the following maximum prices for raw used steel pails and steel covers, f.o.b., the seller:

Pails	*2 Gal.*	*3 Gal.*	*5 Gal.*
Pail with cover	10c.	15c.	20c.
Pail without cover	5c.	7c.	10c.
Covers	*8½ in.*	*10¼ in.*	*11¾ in.*
Cover alone	3c.	4c.	5c.

For fully reconditioned pails of two, three, and five gallons capacity, of all gages, higher maximum prices are established, subject to certain deductions, as follows:

2 gallons	31c.
3 gallons	36c.
5 gallons	45c.

A license is hereafter required of every dealer and reconditioner selling used steel pails or drums for which maximum prices have been established. The licenses are granted automatically.

In regard to maximum prices for steel drums, the revised schedule now requires that a deduction be made from the maximum price of all reconditioned drums which are left unpainted at the request of the purchaser. These deductions are 15c. for the 50 to 58-gallon steel drums, 12½c. for 29 to 33-gallon drums, and 10c. for 14 to 16-gallon drums. Also, a deduction of five cents is now required from the maximum price for all

This simple idea saves *tons of steel* and thousands of dollars

SEVERAL years ago, Millers Falls engineers went to work on an idea that's paying the country generous dividends today . . . dividends in part money, but more important, in desperately needed steel, transportation, storage space, handling, and paper work. The idea was just this:

A full 50% of the potential cutting power of every hack saw blade was wasted because only *one* edge of a blade was a cutting edge. If teeth could be put on the second edge, there would be savings in everything but the actual milling of the teeth. Prime obstacles were drag and wear on the trailing edge. Intensive experimenting solved the problem with a special "set" and special heat treating. After thorough tests, the new two-edged blade was put on the market at a price only 50% above single-edge blades.

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sizes of reconditioned drums covered by the schedule where a kind of paint is used other than enamel, lacquer or varnish.

The revised schedule, as amended, also creates a category for exceptions to make it possible for reconditioners who furnish steel drums with new Heresite linings to petition OPA for permission to charge higher than established maximum prices for such drums.

Machinery Schedule 136

Washington

• • • **Price Administrator** Leon Henderson on Monday announced that maximum prices for second-hand machinery and electrical products will be established July 1 under the terms of Maximum Price Regulation No. 136. Used processing, mining, construction, electrical and railroad machinery and equipment, together with parts of such machines, are included in the machines or parts covered by the regulation.

The action may be the most "flexible" taken to date, with the base period for the pricing of parts and sub-assemblies for war machines and equipment later than the Oct. 1, 1941, base period prescribed for standard machines and parts.

The amendment may be of a formula type, using a selected base period and allowing a "fair" profit margin. It will not interfere with the competitive price structure of producers manufacturing the same or similar items.

One problem which is under consideration is the establishment of a price ceiling on output of producers who are new to the field and do not have any pricing history. OPA will establish a formula under which such manufacturers may obtain a fair margin of profit. Index as to profit margin may be the comparable margin during the period 1936 through 1939. Where this index does not apply, the profit margins of other manufacturers in the field may be used as a basis.

Fabricated Bar Price $2.40

Pittsburgh

• • • **The OPA is expected** to set a price ceiling for the fabricated concrete bar industry, reported to be $2.40 a 100 lb. f.o.b. major basing points. Such a move was predicted in THE IRON AGE several weeks ago.

Concrete bar prices from fabricators have been $2.40 a 100 lb. base or less for some time due to the competition on A-1-a concrete bar business. Fabricators in recent weeks, wishing to obtain A-1-a business, have been forced to meet the mill price of $2.15 a 100 lb. on straight lengths. As long as the rush to obtain A-1-a concrete bar business is on, permission to charge $2.40 by fabricators would be more or less of a theoretical "right." Business carrying ratings lower than A-1-a will of course probably be taken at $2.40 a 100 lb. as has been the case for some time. Fabricators, in order to compete with steel mills on highly rated business, are reported to have cut engineering and trucking extras.

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Metal Control Program Gets Under Way For Certain Consumers

Washington

• • • **The metal control** program for the third quarter of 1942 is one which will call for the utmost of clear understanding. The objective is to obtain a susbtantially complete picture of the basic metal requirements (form PD-275); apportion the available supply so as to cover essential requirements as intelligently as possible; and then to control the input into production of these basic metals in accordance with such a policy.

Any metal fabricating or processing plant operating under the PRP (mainly those whose aggregate metal requirements total more than $5,000 for the quarter) should have requirements other than metal authorized in appropriate balance with the metal requirements of the same plant. This means that the mandatory use of PRP will center around the fabricators and processors of metal, and will include their incidental requirements as well as metal needs. Where such requirements for other materials are not incidental, but dominant, the metals requirements will be apportioned to fit the other requirements.

Part II of the "Specific Instructions" for manufacturers operating under the Allocation Classification system appears on page 112 of this issue.

Certain specialized fields of activity, not primarily manufacturing, will continue under existing procedures, and existing priority instruments and orders will govern procurement in these fields. The operations that fall into these special groups include: Construction, transportation, power, light, heat, water, sewage, communications, mining, petroleum, primary metal producers, and the direct purchases under Lend-Lease and the Bureau of Economic Warfare.

Consumers of less than $5,000 worth of metal during the quarter will also be left to operate under existing procedures. A decision is yet to be made as to the quantities of material to be allowed this group, which will be subtracted from the total before distribution under PRP. A decision will also be made as to the reserve or "kitty" that will be established to take care of emergency requirements.

Requirements for the 3rd quarter as listed by users on form PD-275 have been summarized into 200 industry groups. This information has been submitted to the various governmental agencies concerned, and an analysis for each of the 200 groups by preference rating with reference to metal used and required has been made. The requirements committee of WPB will prescribe a "kitty" or reserve pool

GLENN MARTIN'S NEW DESIGN: First released picture of Glenn Martin's design for a 250,000-lb. flying ship. It far surpasses the 140,000-lb. "Mars" world's largest flying boat up to the present time. The new ship is equivalent in space to the interior of a 15-room house. It will be able to carry 102 passengers each with 80 pounds of luggage, plus 25,000 pounds of mail and cargo. It could reach London in 13 hours.

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and set outside limits—in so far as it chooses to go—for the available supply of key materials. This should be to the 200 groups and also to those not covered by PD-25-a, with such guidance as may be possible as to the extent to which ratings are to be followed, a guide in carrying out the policy arrived at as to apportionment. The requirements committee may state other guiding principles, including minimum inventory. This committee must act by June 13, and the Director of Industry Operations will issue directives, as required, to all processors of forms.

The Census Bureau will calculate the amount available of allocated metals for each plant under the policy established. This will be reflected on the PD-275 forms originally summarized into each one of the 200 industry groups. PD-25-a forms for the same plants should be in Washington by June 20, by which time calculations on the first groups of PD-275's will be finished. The particular PD-275 form will be attached to the appropriate PD-25-a application form for the same plant, so that the guidance given by the Census calculation may be applied to the form.

These forms will then be distributed to the industry branches and armed service arms and bureaus responsible for the product manufactured by the plants. A review of the mechanical allocation of such metals will be made by the materials branches, with the aid of representatives of the other concerned bureaus.

When these steps are concluded, the key allocations are ready for each plant. The adjustment of all other materials and supplies requirements will then be calculated so as to be proportionate to the key metal allocations. PD-25-a forms, as thus processed, are delivered to the applicant.

Applications for metal on PD-1-a coming to WPB are compared, and those from companies under PD-25-a are sent back with a reference to the terms of the regulation. Materials and other items authorized on PD-25-a can only be acquired under that authorization. PD-3-a and other such applications received by such applicants cannot be extended so as to supplement the authorization received on PD-25-a or on the interim relief form, PD-25-f.

Blackplate

• • • **Chemically treated** blackplate would be substituted for tinplate and terneplate in the making of the ends of cans for the packing of specified food commodities by a proposed amendment to order M-81 to be issued shortly by WPB. In addition, it is proposed to substitute electrolytic tinplate for hot dipped tinplate in making the ends of cans. The proposed order is designed to reduce the use of tin in the manufacture of cans covered by the order to about 12,000 tons a year. This compares with approximately 18,000 tons a year of tins permitted under the original M-81.

Refractory Materials

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65

How to Determine Quotas Under M-126

• • • The allowable quota of iron and steel that can be put into process for a period of 45 days from May 5, 1942, under order M-126, should be obtained by finding the total weight of all metals put into process during the year 1942 in the manufacture of the item being appealed, and dividing that weight by 12 to give the average monthly consumption. Because a manufacturer's operations are seasonal he cannot divide by less than 12. After the average monthly consumption has been ascertained, the appellant should take 75 per cent of this average to arrive at his quota. For quick calculations, the 1941 consumption figure may be divided by 16.

The only exception to this would be in the case of a manufacturer who started in business during 1941. In this instance, the 1941 consumption total should be divided by the number of months during 1941 that the manufacturer was actually in business, and 75 per cent of this monthly average be taken to arrive at the manufacturer's quota.

time when transportation facilities are not overburdened, WPB issued general inventory order M-161 which lifts inventory restrictions on materials for the manufacture of refractory brick used in heat-treating furnaces for the manufacture of steel and other products. The order exempts 16 products, none of them scarce, from inventory restrictions of Priorities Regulation No. 1. The materials exempted are: bentonite, kaoline, ball clay, stoneware clay, diatomaceous earth, feldspar, spodumene, potter's flint, domestic andalusite, domestic dumortierite, domestic kyanite, domestic sillimanite, pinite, pyrophyllite soapstone, and talc.

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Warehouse Investigations

• • • WPB's search for priorities violations in the steel producing field has been extended to the steel warehouse industry. Announcing that operations of 800 large steel warehouses are to be surveyed shortly it was made clear that the scope of the inquiry is to be extremely broad. Not only will questionnaires be sent out, but 200 investigators of the Labor Department's Wage-Hour Division will make the "necessary field examinations."

"Approximately 15 per cent of all iron and steel production is distributed through warehouses and it is essential that these products be stocked and distributed in accordance with the needs of the war program," it was stated. "The Compliance Branch will analyze the completed questionnaires and will initiate punitive action in cases of demonstrated violation of WPB orders."

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Safety Equipment

• • • Because the previously required rating of A-2 or higher was too restrictive, WPB announced that permission has been granted

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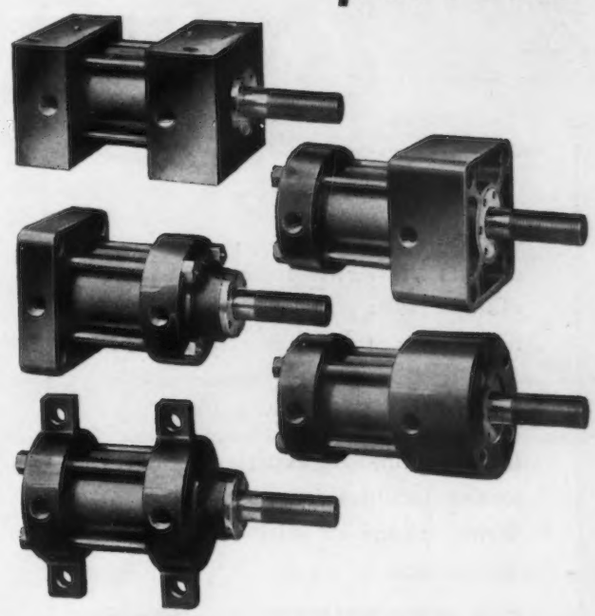

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to sell safety equipment assembled from parts which were in inventory on May 5 on A-10 or higher orders. This amendment to L-114 will make it easier for plants to obtain equipment necessary to prevent accident and loss of life. The order prohibits the use of critical materials in safety equipment, but does not require a rating for the sale of equipment using non-critical materials. It was added that types permitted to be sold, however, are not yet available in quantity.

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Burners

• • • **An amendment** to L-74 permits continued production of burners designed for use on shipboard, for cooking, or heat treating and processing. The original regulations required that production of such types as "Class A" burners cease on May 31, but under the amendment they can be produced to fill orders bearing A-10 or higher preference ratings.

↓ ↓

Oil Burners

• • • **Oil burners** designed for use on shipboard, for cooking, or heat treating and processing may continue to be produced under an amendment to order L-74. The amendment designates such types as "class A" burners, and may be produced to fill orders bearing A-10 or higher preference ratings.

↓ ↓

Foundry Equipment

• • • **Suppliers and** sub-suppliers of foundry equipment and repair parts may continue to use ratings assigned by order P-31 to complete their deliveries after the expiration of the original P order. Order P-31 expired May 30 and the extension ruling was included in supplementary order P-31-a.

↓ ↓

Small Stokers

• • • **To speed conversion** of oil burning equipment to coal, small stokers from materials in manufacturers' hands on May 31, may be assembled. Amendment 1 to order L-75 grants this permission. A possibility of allocating sufficient amounts of pig iron and scrap metal for the manufacture of grates is being studied. A number of foundries are already producing a special pattern of grate designed to fit all types of small furnaces and boilers.

↓ ↓

Farm Tractors

• • • **Drastic limitations** on the use of copper in the manufacture of farm tractors and engine power units are imposed by order L-26-c, effective June 15. The order specifies that no copper products may be used, even from inventory, in the production of farm tractors or engine power units, other than for: radiators, cooling control devices such as thermostats; electrical equipment including only mag-

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Aircraft Bearings

• • • **The latest industry** to be concentrated produces anti-friction aircraft control and pulley bearings. The order, L-45, provides that after June 9 a producer of bearings may not accept any purchase order for any of the sizes specified on an exhibit attached to the order, unless he is designated as an "authorized producer" of the size sought to be purchased.

By concentrating manufacture of specified sizes, larger runs of such sizes can be made by producers. It will also be possible to release many hours of highly skilled machine setters' time.

If a producer has completed parts or bearings in inventory, however, he may deliver these to purchasers.

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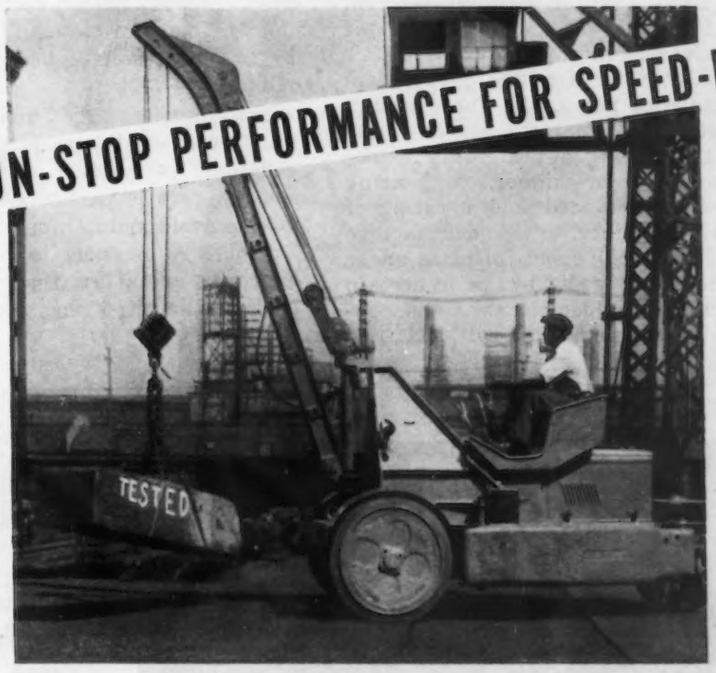
Uniform Policy Established For WPB Order Appeals

• • • **A uniform policy** to be followed in consideration of appeals for permission to continue production that has been halted by WPB conservation and limitation orders was announced by the WPB. The policy adopted will govern decisions on appeals to assemble processed or semi-processed inventories beyond cut-off dates or in excess of limitation quotas. In general, such appeals will not be granted except when the materials involved have already been fabricated to such an extent that their use as scrap would be grossly wasteful.

Granting of appeals will be considered only after it has been determined that no other adequate relief is available to the applicant. Relief available in many cases without granting an appeal from the terms of a WPB order includes: (1) Assistance in disposing of frozen inventory materials to other companies permitted to use them or to Government agencies; (2) resale to the source of supply; (3) assistance in obtaining war orders or in conversion of facilities to direct war production; (4) advice on obtaining financial assistance from the Bureau of Finance in the Division of Industry operations; and (5) assistance in the disposal of idle production equipment.

Before filing an appeal under an order, any company that considers itself subjected to undue hardship should consult with the nearest WPB field office to determine whether any of the assistance forms outlines will solve its difficulties.

When an appeal is filed, no such appeal will be granted unless the amount of unprocessed critical material is exceptionally small and the following tests are met: (1) Processed inventory must be without salvage or reclaim value to war production, and, if not assembled, must have small scrap value compared to the worth of the completed item; (2) the appellant must not be in violation of existing orders; (3) the appellant must not have purposely processed a large inventory with the view of requesting preferential treatment or have otherwise violated the spirit of the order from whose terms is appealing; (4) the labor to be employed for the assembly of the inventory will thus be trained for war work, or if this is not the case, the labor so used for assembly should not be required immediately for war production; (6) consideration will be given if granting the appeal will help finance conversion to war work, or, if this is not the case, will relieve the appellant's financial stress and in no way interfere with the war effort; (7) granting the appeal must not give the appellant any substantial advantage over competitors in a like situation; and (8) no permission will be granted to use or procure materials that are very scarce, such as nickel and tungsten, except when the amount is extraordinarily small and the article manufactured will have an unusually large value to the national economy.



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SWING BOOM TRACTOR CRANE—2½, 5, & 10 TON CAPACITIES

SILENT HOIST WINCH & CRANE CO., 851 63RD ST., BROOKLYN, N.Y.

Tin Products

• • • **An amended version** of the tin conservation order, M-43-a, was issued to provide additional tin for essential needs. Tin used in non-critical products will be cut another 10 per cent, effective July 1, and this reduction, plus others, are contained in the amended order. Use of tin in some 28 types of products (grouped as List "A") is forbidden, as in the original order. In all other products, except those covered by other specific orders, may, after July 1, be used only 30 per cent of the amount of tin used in the corresponding quarter in 1940.

Restrictions to the 30 per cent use does not apply where substitutes are impracticable in products bearing a preference rating of A-1-k or higher, to bearing metals produced with a rating of A-3 or higher, to the manufacture of terne plate and tin plate under the terms of M-21-e, or to certain kinds of solder for cans and containers under orders M-81 and M-86. Tin oxide use is restricted to orders of A-1-k ratings or higher.

Warehouse Quotas

• • • **A request that** steel warehouses curtail their quotas of Schedule A products or eliminate them entirely if possible was made by the WPB. Schedule A includes plates, shapes, bars, rails, armor plate, forgings, and other critical products badly needed for war production and for which deliveries by warehouses have been steadily reduced.

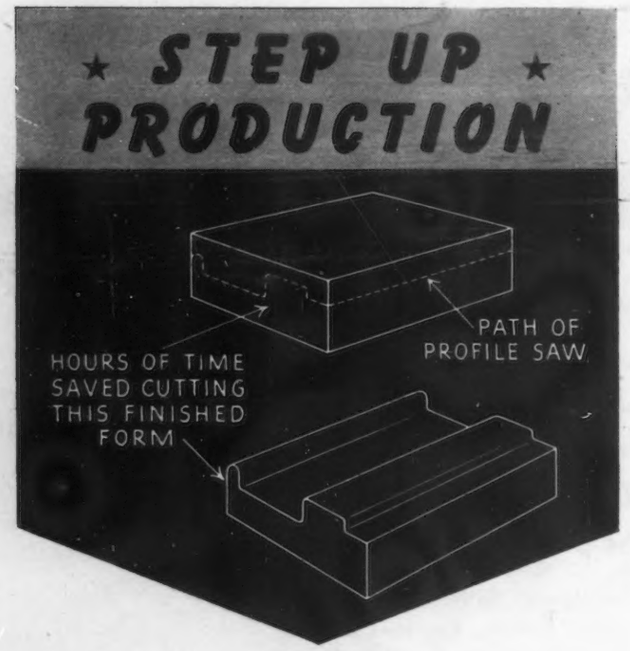
In curtailing the number of warehouse stocks, voluntary cancellations of product quotas are solicited. It is particularly desirable to avoid maintaining stocks of Schedule A products for which a quarterly quota less than the following quantities has been assigned:

	Hot Rolled Products	Cold Rolled Products
Carbon steel	40,000 lb.	20,000 lb.
Stainless steels	6,000 lb.	6,000 lb.
Tool steels	4,000 lb.	4,000 lb.
Other alloy steels ..	20,000 lb.	10,000 lb.

Cancellation of total Schedule A products quota will, of course, relieve the warehouses from the requirement of filing a monthly report on form PD-83. If total quotas are given up, the warehouse A-9 certificates and quota on form PD-83-a should be returned to the warehouse unit for cancellation.

Benzene

• • • **Benzene was placed** under complete allocation control by order M-137. Because of the demand for benzene in making aviation gasoline, synthetic rubber, phenol for plastics, and aniline for high explosive tetryl, delivery or acceptance of benzene after July 1 is prohibited except on specific authority from the WPB. Quantities of 50 gal. or less to one person is one month are excepted.



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Remember . . . a machine for contour sawing is no better than its saw. The saw does the cutting, not the machine.

MILFORD PROFILE SAW is made by the world's largest, most experienced producer of metal cutting band saw. It is carried in stock by Mill Supply Distributors in every locality.

Perhaps you have a band saw machine that can be easily adapted to Profile Sawing. If so, write us at once for directions. Write also for a free sample of MILFORD PROFILE SAW, giving specifications of blade you now use and description of cutting job and machine.

THE HENRY G. THOMPSON & SON COMPANY
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Also makers of MILFORD REZISTOR HACKSAW BLADES

This Week's Priorities and Prices

Copper use in farm tractors and engine power units has been drastically restricted beginning June 15, by order L-26-c. (WPB-1279)

Warehouse quotas on schedule A products have been requested to be reduced or eliminated by the Iron and Steel Branch. (WPB-T408)

Malleable iron and high alloy steel casting manufacturers have been given formulas for establishing maximum prices for castings that cannot be priced under the general maximum price regulation. (OPA-PM3519)

Allocation classifications, a new system of material control, will enable tracing material flow in terms of end use from primary producers to the finished products. (WPB-1259)

A **uniform** policy to be followed in considering all appeals for permission to continue production halted by WPB orders was announced. (WPB-1264)

Radio receiver order L-44 was clarified by interpretation No. 1. (WPB-1266)

Platinum inventory and use controls are set up by order M-162, May 30. (WPB-1267)

Special committee on Cargo Planes was announced by Chairman D. M. Nelson. (WPB-1271)

Iron, steel revised price schedule 6 was amended (No. 5) May 30, to permit wire producers under certain circumstances to use the former discount on bale tie wire customarily granted to particular bale tie manufacturer. (OPA-PM3512)

Group advisory committees have been formed for: Farm machinery and equipment export; officers' military insignia manufacturers; gypsum; refrigeration valve and fittings manufacturers; canned salmon; and proprietary drug manufacturers. (WPB-1247)

Cutlery manufacture restricted by order L-140, May 30. (WPB-1257)

Scrap metals and alloys placed under import control by amendment 7 to order M-63, effective June 1. (WPB-1261)

Bronze powder use in printing and publishing is extended by order M-9-c-3, as amended May 30. (WPB-T394)

Benzene is placed under complete allocation by order M-137 as amended, effective June 1. (WPB-T395)

Plumbing order P-84 interpreted permitting installation of more material than removed if substitute is less critical. (WPB-T398)

Musical instrument output will be stopped soon by order L-37-a, issued May 29. (WPB-1246)

• • •

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 *means announcement* 600 *issued by the War Production Board.)*

Revisions for THE IRON AGE Priorities Guide

• • • To correct THE IRON AGE Priorities Guide, issued with the magazine on June 4, make the following additions to the Guide in their proper positions.

Under "M Orders," page 6, add:

M-8-a...Amendment No. 2 (5-30-42) eliminates section governing crown cap delivery.

M-9-c-3...Amended 5-30-42 to permit use of remaining stocks of bronze powder for printing, prohibit manufacture of paste, ink, or leaf with bronze powder, etc.

M-20-a...Amendment No. 1 (5-30-42) extends order until revoked.

M-38-i...June lead pool. (6-1-42)

M-43-a...Amended (6-5-42) to cut non-critical tin use another 10 per cent, effective July 1, and to forbid its use in 28 listed types of products. Related forms: PD-229 and PD-300.

M-56...Amended (6-5-42) to remove restrictions on use of natural resins for certain products. Related form: PD-339.

M-63...Amendment No. 7 (6-1-42) places scrap metals and alloys under order.

M-63...Amended (6-2-42) to take control of imports of listed commodities for civilian use as well as strategic war materials, effective July 2. Expires when revoked. Related forms: PD-222-a, PD-222-b, and PD-222-c.

M-101...Subjects use of "strategic mica" in products for Army and Navy to complete control by amended order. (5-23-42) Related forms: PD-480.

M-104...Amended order (5-30-42) limits blackplate used for bottle caps for beer and non-alcoholic beverages and other provisions.

M-137...Amended (6-1-42) to place benzene under allocation control. Related forms: PD-223-a and PD-224-a.

M-142...Amendment No. 1 (6-1-42) excepts cleaning compounds and certain lubricants from order, and permits use of material on hand May 4.

M-158...Prohibits use of coatings containing certain organic binders or pigments for coating steel containers after June 20. (5-30-42)

M-159...Allocates all grades of butyl alcohol. (5-28-42) Related forms: PD-505, PD-506.

M-160...Allocates beryllium (6-1-42). Related forms: PD-497 and either PD-494 or PD-496 (WPB not clear on this form).

M-161...Lifts inventory restrictions on materials for manufacture of refractory brick used in heat treating furnaces. Exempts 16 materials from Priorities Regulation No. 1. (6-1-42)

M-162...Controls traffic in platinum (6-2-42). Related forms: PD-512, PD-513 and PD-514.

M-163...Allocates by-product ammonia and sulphate of ammonia (6-1-42). Related forms: PD-237, PD-503, and PD-504.

M-164...Allocates synthetic ammonia (6-1-42). Related forms: PD-237, PD-503, and PD-504.

M-165...Allocates cyanamid (6-1-42). Related forms: PD-237, PD-503, and PD-504.

M-167...Allocates capryl alcohol, effective July 1 (6-1-42). Related forms: PD-525 and PD-526.

M-168...Allocates isopropyl alcohol as of July 1 (6-1-42). Related forms: PD-521 and PD-522.

M-169...Allocates methyl ethyl ketone as of July 1 (6-1-42). Related forms: PD-523 and PD-524.

M-171...Allocates chlorate chemicals (6-1-42). Related forms: PD-515 and PD-516.

Under "P Forms," page 13, add:

P-31-a...Permits suppliers of foundry equipment and parts to use ratings assigned by P-31 after its expiration May 30, 1942. (6-5-42) Related form, PD-81. Rating assigned, A-1-b.

P-84...Interpretation No. 1 (6-1-42) permits installations calling for more material than that being replaced if substitution is of less critical material for that which is more critical.

P-129...Amendment No. 1 (6-3-42) postpones restrictions until Sept. 1, 1942.

P-130...Amendment No. 1 (6-3-42) postpones restrictions until Sept. 1, 1942.

Under "L Orders," page 19, add:

L-13 a...Amendment No. 2 (6-1-42) removes wood filing cabinets with not more than 2 lb. of steel hardware for each drawer from limitations of order.

L-21-a...Amendment No. 2 (6-4-42) includes parts under terms of order.

L-26-c...Curtails copper use in farm tractors and engine power units after June 15, 1942. (6-3-42)

L-29...Amendment No. 1 (6-2-42) exempts mechanical and electrical railroad, grade crossing, and highway signals from order.

L-37-a...Halts manufacture and freezes stocks of musical instruments listed, effective June 1, 1942. Related form: PD-498.

L-41...Interpretation No. 1 (6-6-42) on various classes of construction, cost estimates, and design changes.

L-42...Schedule 10 (5-29-42) orders simplification of electric cellar drainers (sump pumps) to conserve copper.

L-42...Schedule 12 (5-28-42) prohibits after June 20 use of metals other than joining hardware, coating, or mesh, in a list of plumbing fixtures. Related form: PD-423.

L-50...Amendment No. 1 (6-4-42) permits installation of permanent telephone equipment for temporary equipment, and other leniences.

L-54-a...Amendment No. 2 (5-30-42) permits manufacture of non-portable typewriters in June and July at same rate permitted in May.

L-54-a-1...Lists typewriter manufacturers and July production quotas. (5-30-42)

L-54-c...Limits manufacture of new office machinery (6-1-42). Related forms: PD-1-a, PD-3, PD-3-a, and PD-423.

L-54-b...Terminates order (6-1-42), effective immediately.

L-68...Amendment No. 1 (5-28-42) permits use of zippers manufactured prior to April 1, 1942, in specified articles, and reconditioning and sale of used slide fasteners.

L-71...Amendment No. 1 (6-5-42) permits use of plated iron and steel inventories in flashlight manufacture.

L-74...Amendment No. 1 (6-4-42) permits production of oil burners for use on shipboard, for cooking, or heat treating and processing.

L-75...Amendment No. 1 (6-4-42) permits assembly of small stokers from materials on hand May 31.

L-83...Amendment No. 1 (5-29-42) exempts small household types of machinery from terms of order.

L-91...Amendment No. 1 (6-3-42) adjusts production curtailment program for commercial laundry and dry cleaning machinery to conform to customary manufacturing practices of industry. Related form: PD-418.

L-97-a-1...Amendment No. 2 (5-28-42) permits sale of equipment used in construction or repair of railroad cars between producers or suppliers of materials.

L-105...Amendment No. 1 (6-5-42) permits assembly and sale of protective helmet parts in process April 29 and sale of helmets already manufactured.

L-114...Amendment No. 1 (6-4-42) permits sale of safety equipment assembled from parts in inventory on May 5 on orders A-10 or higher.

L-140...Controls the production of various types of cutlery. (5-30-42)

Under "Priority Regulations," page 33.

No. 1...Allocation classification established on orders or contracts placed after June 30, 1942.

PERSONALS

• **H. N. Arbuthnot** has been made assistant general sales manager, Allegheny Ludlum Steel Corp.'s sales division, Pittsburgh. Mr. Arbuthnot has been with the company since 1926 when he became Detroit district manager for the former Allegheny Steel Co., holding that position through the merger with Ludlum in 1938.

• **Edward T. Barron** has been appointed chief metallurgical engineer, Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **C. F. W. Rys** who has been made chief consulting metallurgist under the vice-president in charge of operations. Mr. Barron had served as manager of the metallurgical division of the Pittsburgh district for the last seven years. He started with the company in 1905 and from that time until 1911 he was in the inspection departments of the company's Duquesne and Mingo plants. Since 1911, Mr. Barron has served the company in the general offices of the metallurgical division. **Richard W. Simon,** formerly assistant manager, has been named to replace Mr. Barron as manager of the metallurgical division, Pittsburgh district.

• **C. F. Pittman,** manager of the motor division of General Electric's industrial department, has been named assistant to the manager of the industrial department. **W. H. Henry,** who was manager of sales in the motor division, succeeds Mr. Pittman as manager of the division.

C. F. PITTMAN and W. H. HENRY, assistant to manager, industrial department and manager of sales, motor division, respectively, of the General Electric Co.

• **C. W. Spittal** has been appointed general manager, and **R. W. Breeler** assistant general manager of Allegheny Ludlum Steel Corp.'s operations at its plants at Dunkirk, N. Y. **C. Cottrell** has been named production manager of the Howard Ave. plant and **Merle Graham** will be production manager of the Brigham Rd. plant.

W. H. Norris has been made manager of the Watervliet, N. Y., plant, with **J. Q. A. Doolittle** as assistant manager and **G. Anderson** as production manager.

• **Robert E. Lewis** has been elected treasurer and **John G. Nelson** has been elected secretary and assistant treasurer of the American Steel & Wire Co., subsidiary of the U. S. Steel Corp. At the same time **John N. Moylan** was elected assistant treasurer with offices in Chicago, **Robert Gordon** was elected assistant treasurer with offices in New York, and

E. T. BARRON, chief metallurgical engineer; C. F. W. RYS, chief consulting metallurgist, and R. W. SIMON, manager, metallurgical division, Pittsburgh district, Carnegie-Illinois Steel Corp.

John B. Cavanagh was elected assistant secretary, Cleveland.

• **Harry V. Jamison** of the advertising division of Carnegie-Illinois Steel Corp., has retired following an illness of some months. Having had 38 years of active service with subsidiaries of United States Steel, he was the senior advertising official in the entire U. S. Steel connection.

• **Robert C. Wilkin** has been appointed Pacific Coast manager of Dodge Copper Products Corp., New York. Mr. Wilkin will make his headquarters in Los Angeles.

• **Alfred Sontag** has joined the staff of the testing machine department of the Baldwin Southwark Division of the Baldwin Locomotive Works, Philadelphia. Mr. Sontag, who was for 10 years chief engineer and sales manager of the Riehle Testing Machine Division of American Machine & Metals, will be active in testing machine production and development.

• **James R. Gray** has been appointed general superintendent of the Bell Aircraft Corp. plant in Buffalo. **William Selikoff** will take over Mr. Gray's position as night-shift superintendent **R. Milton Wilkins,** formerly in the contracts division, has been named manager of the division to suceed **Robert Borcherdt,** who has resigned to join the Arens Control Co., of Chicago.

• **Walter N. Deisher** has been named general manager of Fleet Aircraft Ltd., to succeed **W. Jack Sanderson,** former president and general manager.

• **Col. W. V. Andrews** has been appointed special assistant to William J. Crosswell, director of military contracts for the Curtiss-Wright Corp., Airplane Division.

• **Reginald S. Dean,** chief of the metallurgical division, Bureau of Mines, has been appointed to the post of assistant director of the Bureau.

• **L. F. Niemann** has been appointed district manager of the Scully Steel Products Co.'s St. Louis warehouse, and **J. K. Rittenhouse** has been named the company's district manager of Twin City warehouse at St. Paul.

• **Robert L. Hoover,** formerly art director and production manager of MacDonald Potter Inc., Chicago, has been appointed assistant to the advertising manager of the Cardox Corp., Chicago.

• **Hampson Carey** has been made assistant treasurer and **James H. Donovan** has been appointed manager of credits, Jones & Laughlin Steel Corp., Pittsburgh.

• **A. A. Weidman,** formerly superintendent of the car assembly department of Cadillac Motor Car Division, General Motors Corp., has been named superintendent of the welding and sheet metal division for combat vehicles. **A. J. Reno,** Mr. Weidman's assistant, has been named superintendent of the assembly division for combat vehicles.

• **William P. Woodside,** president of American Twist Drill Co., Detroit, for the past 18 years has been elected chairman of the board, being succeeded in the presidency by **William F. Murray,** vice-president and general manager.

• **Robert L. Coe,** vice-president of Chase Brass & Copper Co., Inc., Waterbury, Conn., was elected president of the Copper and Brass Research Association at its 22nd annual meeting. He succeeds John A. Coe, president of the American Brass Co., Waterbury. Vice-presidents elected were: **John A. Coe,** president, American Brass Co.; **Wylie Brown,** president, Phelps Dodge Copper Products Corp.; **R. E. Day,** president, Bridgeport Brass Co.; **C. L. Smith,** treasurer, National Copper & Smelting Co.; **W. M. Goss,** vice-president, Scovill Mfg. Co. **C. Donald Dallas,** president, Revere Copper & Brass, Inc., was elected treasurer; **T. E. Veltfort,** manager, and **Bertram B. Caddle,** secretary.

• **Eugene P. Rougé** has been named to the position of comptroller of the Monmouth Products Co., Cleveland. Mr. Rougé has for several years been a partner in the firm of Moise & Burgess of Cleveland, certified public accountants.

• **V. A. Jevon** and **A. J. Hazlett** have been appointed assistant general managers of sales, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Jevon has been assistant to the vice-president in charge of sales since October, 1938, while Mr. Hazlett has been manager of the strip-sheet sales department. **Clarence C. Wehling** has been appointed assistant district sales manager of Jones & Laughlin at Pittsburgh and **F. H. Davidson** has been made assistant manager of sales of the hot rolled sales department.

• **Fred W. Elliott** has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to the division of organic chemistry.

• **K. T. Keller,** president of Chrysler Corp., has become an adviser to the Army on its $30,000,000,000 ordnance program on the staff of Maj.-Gen. Levin H. Campbell, Jr., who is new chief of ordnance.

OBITUARY...

• **John A. Murray,** superintendent at the Detroit (Chrysler) Tank Arsenal, died of injuries received in an automobile accident. He was 58 years old.

• **Fred Glander,** formerly general superintendent of the Renown Stove Co., Owosso, Mich., died recently, aged 72 years. He had been in the employ of the company since 1906.

• **Joseph T. Blythe,** manufacturer's agent and an earlier backer of aviation companies died recently. He was 57 years old. He was founder and president of National Airways, Inc., one of the original backers of the Stinson Aircraft Co., and vice-president of the Stinson Sales Co., at one time.

• **John Johnson** who retired a year ago after having been superintendent in Milwaukee for the Grinnell Co. for 23 years and who started with Grinnell 38 years ago as a pipe fitter, died after a long illness. He was 67 years old.

• **Henry H. Scherff,** one of the proprietors of the Scherff Machine Co., Milwaukee, died May 30, aged 30 years.

• **Hobart S. Johnson,** former president of the Gisholt Machine Co., Madison, Wis., died June 2. He was 68 years old.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Not All Expansion Projects To Be Abandoned

Cleveland

• • • **With rumors rapidly multiplying** concerning the expected abandonment by the Federal government of various construction and expansion projects, machine tool observers in this area have been highly interested in the newly announced Federal plan to build a large plant in Ohio to turn out new liquid-cooled airplane engines, a further expansion on Ohio Crankshaft's production facilities and Federal plans to design an Army tank innovation. The willingness of the government to embark upon the production of new types of equipment certainly would indicate that there will be no complete end to plant expansions, so that war developments and shifts in the tides of the conflict are likely to necessitate the production of new war implements or perhaps change the emphasis of production from some items to others.

Nevertheless, the industry has been generally impressed with the apparent intention of the government to abandon many important projects. Although there are rumors of many such abandonments, it will probably be several weeks before definite word will be forthcoming identifying the particular projects to be halted, and it is not unlikely that the censors may prevent the publication of such information.

The industry is following with interest various meetings of technical associations at which discussions are going on concerning the new NE low nickel alloy steels. Moreover, a large Ohio machine tool manufacturer has been conducting its own tests and reports that the Brinell hardness desired can be attained, but thus far the impact resistance quality of the steel has not been established.

The Ohio Crankshaft Co.'s Tocco Division is now expected to be turning out these induction heating units at a rate ten times its output of a year ago.

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Chicago

• • • **Hopes of small shops and** garages in this area to participate in the district's small caliber bullet core production program were dashed last week by reports that ordnance officials had decided to place the job in the hands of a few large, experienced plants.

The original plan called for the production of a large number of inexpensive single purpose lathes which should be sold to small plants. Ordnance officials however, were not satisfied with output and production cost of this lathe and abandoned the plan.

Cuneo Press, the key prime contractor in the program, is reported to have developed a new automatic machine which is somewhat faster than the lathe originally considered and will produce the cores at about one-fourth the cost of the other unit.

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Cincinnati

• • • **Production of machine** tools is definitely running substantially ahead of last year and management generally reports that output is ahead of levels that they had only imagined heretofore. Despite the high rate of operations, the employment of women has not left the discussion stage, except in one or two small plants producing small machines. So far, reliance has been placed solely on men, but a decided slowing up in the available labor market is definitely noticed. Vocational training in the local schools has been helpful, but, of course, additional training in the shops is always necessary to develop these men. Some plants report further cancellation of business, but state that the influx of new business has more than offset the loss of orders which were previously only on the backlog.

MARVEL SAWS

LOW COST—HIGH SPEED

MARVEL

MARVEL 4-B shaper action high speed Hack Saw.
Screw-feed. Ball-bearing saw frame.
Quickaction vise.
Cuts 6" cold-rolled bar in 8 minutes —other sizes in proportionate time.

MARVEL

The performance of MARVEL 4-B is high speed cutting with low cost operation because it will out-cut any other saw in its price class. Has draw-cut and lift return giving blade longer life. Has accurate, rigid frame action. 6" x 6" capacity and a speed of 149 strokes per minute. MARVEL 4-B may be had with cabinet base and with 4 speeds.

BUY FROM YOUR LOCAL DISTRIBUTORS

Write for Bulletin about these low cost machines featuring speed and efficiency.

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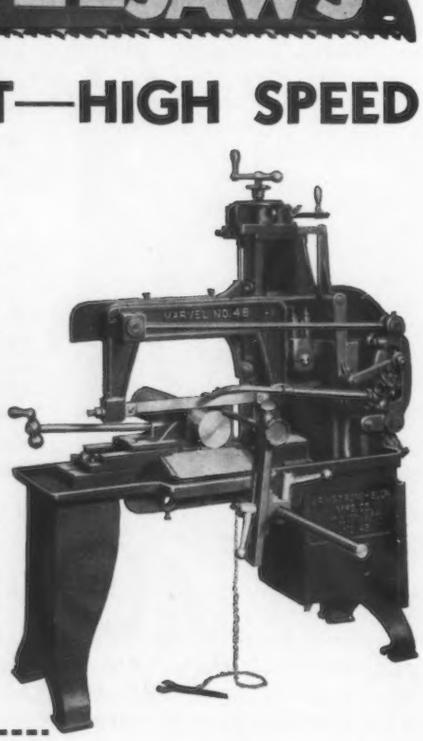

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

WPB Warns of Acute Materials Shortage

• • • **The government will spend** more than a billion dollars to increase production of aluminum, magnesium, copper and nickel, according to William L. Batt and A. I. Henderson, reporting on the growing material shortage. Mr. Batt is chairman of WPB's requirements committee; Mr. Henderson is the newly-appointed director of materials. Private industry, they add, will expend an additional $145,000,000. The following are the non-ferrous highlights of their report:

Nickel is not available in quantities sufficient to fill all demands in spite of the fact that the United States and its allies control practically all the world's supply. The fact that the government has allocated $20,000,000 for the production of nickel in Cuba from 1 per cent ore is ample evidence of the need for the metal.

Aluminum production this year should be approximately 1,083,000,000 lb., not counting secondary production or imports. The initial program of 850 million pounds annual capacity is now in production, and another 600 million pounds will be in production about Aug. 1. Preliminary work on a second 600 million pound program is under way, and some 450 million pounds will probably be received from Canada next year. This will mean a total supply of more than two and a half billion pounds in 1943, as compared to primary production in 1939 of 330 million pounds.

Magnesium is limited in output largely by the amount of power available. Part of the power problem has been solved by use of the ferro-silicon process which employs gas instead of electricity for power. It is expected that magnesium production can be increased to 600 million pounds a year, almost 100 times the 6,450,000 lb. consumed in 1939. This year's production should approximate 170,000,000 lb.

Copper is headed in the direction of constantly growing shortages, despite the fact that production and imports are setting a record. Substitution of steel for brass in shell casings is advisable only in certain cases, and the amount of silver that can be substituted for copper in electrical conductors is also limited. Over-ceiling prices are being paid for high cost copper and the premium price plan provides a monthly reward for producers who exceed quotas. Government financing and other steps are being taken to get more copper out of the ground. However, 98½ per cent of domestic production comes from 15 mines, and it takes 270-odd mines to produce the remainder. Domestic production and imports this year should amount to 1,800,000 tons, and scrap recovery should add another 300,000 tons. Consumption for civilian use in 1939 was about 800,000 tons, but from here out only a necessary minimum will be available for essential non-military needs.

Tin supply is a story soon told but not easily mended. Consumption for years has run between 80,000 and 100,000 tons, with the bulk of it going into tin cans. Practically all of it was imported from Malaya and the Netherlands East Indies. Bolivian ore is now being smelted along with ore from the sizable U. S. stockpile in the newly-completed Government smelter in Texas. Imports from Bolivia now amount to some 18,000 tons a year.

Extension of the war production drive into the non-ferrous metal mining industry will be launched at a joint labor-management rally to be held at Butte, Mont., on June 13. Another effort in this direction is the establishment of a non-ferrous metals committee to integrate the work of the copper, lead and zinc branches of the WPB. The committee's function will be to work jointly with the labor production division.

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Photograph shows Model C-F Positioner with weldment tilted 135°.

Tilted at 135° (from horizontal) this circular weldment is being rotated at variable speed in a complete circle for down-hand welding. With push-button control in one hand and rod in the other, this welder has a "production-line" job—faster, safer, better welding on a C-F Positioner. You can speed up *your* work on one of these machines which handle any size or shape up to 14,000 pounds.

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SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Loss of Home Scrap Increases Anxiety

• • • **Gusts of controversy** and whirlpools of dissension gave the market a storm-tossed appearance last week but underneath the surface the flow continued strong and the current was directed as usual toward the objective of more scrap.

Some of the anxiety expressed in certain quarters was justified, however. With lend-lease activity showing a marked increase, the steel industry probably will lose several hundred thousand tons of "home scrap" because of the exportation of ingots and semifinished steel. This deficiency, although not too large from a total standpoint, will have to be made up nevertheless.

Reports from major centers this week indicate that the movement is still good, but here and there signs have appeared that collections are a little lower, perhaps due to the combination of the labor shortage and the non-recurring nature of certain scrap drives.

A "threatened bottleneck" in some scrap metal dealers' yards in some localities may force the government to request steel mills to buy scrap metal direct, and prepare it for the furnaces in their own yards, said L. J. Rosenwald,

More scrap news appears on page 98 this week.

chief of the BIC, on June 4.

The answer to the problem is not for the mills to go more into the scrap business but for the government to make it possible for the scrap industry to perform in a normal manner and especially to expand its labor supply, replied E. C. Barringer, president of the Institute of Scrap Iron & Steel Inc. He asserted scrap yard forces have been depleted both by the draft and the loss of labor to war contractors who are able to offer wages denied the scrap yards by reason of the OPA price ceiling on scrap.

At Detroit, announcement was made June 4 by WPB and the Automotive Council for War Production that the auto industry will put on an intensive campaign to scrap obsolete machinery, equipment and buildings. Accord has been reached apparently on formulation of a method by which the degree of obsolescence can be measured to determine whether certain items shall be scrapped.

A vast national stockpile of 10,000,000 tons of scrap must be attained through salvage, to maintain steel production next winter, said C. H. McArthur, of the BIC, in Detroit. He declared the margin of scrap supply now is "too close for comfort."

Meanwhile, announcement was made that the steel industry is planning to spend $1,500,000 on a campaign urging the gathering of scrap materials. Advertisements will be placed in many media.

•

PITTSBURGH — Supplies are moving fairly well to steel mills, although collections and loadings by dealers have been off slightly from a few weeks ago. Major worry centers on the possibility that not enough scrap will be collected and piled in order to forestall a serious shortage next winter. An increase in the amount of lend-lease activity involving ingots and semi-finished steel will place a heavy burden upon dealers and brokers who must make up for the loss in "home scrap" because of exportation.

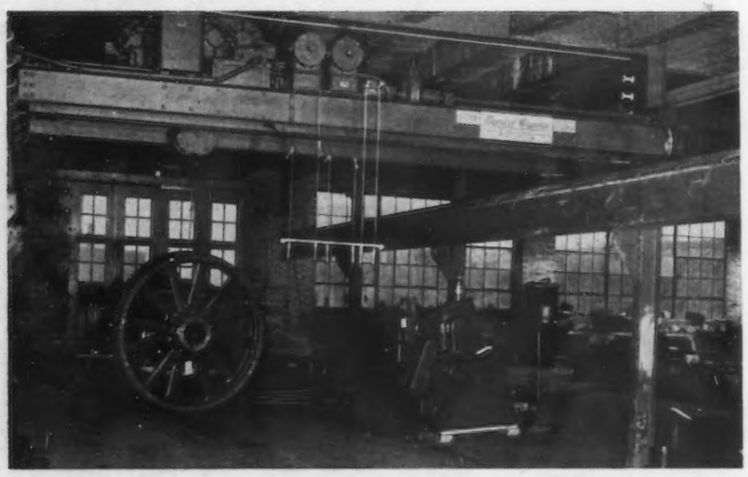
•

PHILADELPHIA — The supply continues good as indicated by diversion last week to the West of 100 cars originally earmarked for an eastern Pennsylvania mill. Quality is improving. Early confusion over grading and classification is being ironed out. A six-week drive at the Disston plant uncovered 3000 tons of scrap. The graveyard drive in the area is producing substantial results.

•

CHICAGO—Despite all efforts, steel mills here are still not able to build stocks against the winter months. The volume of steel turnings coming onto the market is increasing daily. While at the moment steel mills are using this material loose, it is expected that as the volume continues to grow, means will have to be developed to permit its ship-

CONCO OVERHEAD CRANES



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ORANGE DEPARTMENT — MENDOTA, ILLINOIS

Complete Segregation Seen Close at Hand

• • • The long-predicted Federal order compelling segregation of all-steel scrap in order to obtain more effective recovery of the nickel and chrome content is reported to be close at hand. Washington officials are expected to order producers of 10 tons or more of alloy scrap monthly to segregate this scrap by grades according to SAE types.

ment in more solid form. With briquetting capacity limited, the scrap trade is leaning toward the use of baling presses, with fender stock being used to form the container. This type of "bundle" is said to find ready acceptance from steel mills. However, OPA price schedules will not permit the sale of this material under the bundle price and it is not economically feasible to perform this operation on the basis of the loose turning price.

•

CLEVELAND—Since the usual lake movement of scrap to Cleveland is sharply curtailed this year, the scrap situation here is viewed with alarm by some observers who believe that very little scrap will be stored for winter use. Some foundries have been able to set aside some tonnages of the more easily available cast grades. The reported forthcoming WPB order forcing segregation of alloys may cause hardships at some plants where such alloys are being mixed due to involved production methods and an assortment of items being turned out. On the other hand, it will be welcomed in the case of triple alloy turnings, which have been extremely difficult to market.

•

BOSTON — The prospective plan of WPB to aid steel mills to obtain scrap direct took the trade somewhat by surprise inasmuch as mills for some time have been doing just that thing. New England auto graveyards have disposed of at least 50 per cent of their old cars for scrap during the past three months. Bethlehem Steel Co., American Steel & Wire Co. and other steel mills already have directly contracted for sizable tonnages, the Sweets Steel Co., Williamsport, Pa., is dickering with Springfield, Mass., for 3000 tons of abandoned street railway rails and other Pennsylvania as well as New York mills are doing a little private hedging for heavy scrap in New England.

•

NEW YORK—Direct dealing by mills still is the big headache for dealers and brokers here. One mill is taking ungraded material and others are strictly enforcing OPA grade regulations. The barge movement remains brisk. The sinking of a 450-ton load occurred near Rochester in the canal last week, the result of a collision. Service on the Second Avenue elevated line in New York City will suspend soon, preliminary to demolition of the structure.

BIRMINGHAM—Increased attention is being given here to bringing out additional material from auto graveyards although scrap from this source has been fairly good in recent weeks. Scrap generally is coming into this area satisfactorily but the quality in many instances is not comparable to quantity.

•

CINCINNATI — The flow of material from campaigns practically has passed its peak. Mills appear to be receiving sufficient scrap to maintain present operations, but the hope for building inventories has not yet been realized. Steady complaint over the diminishing quantity of rail scrap is coming from castings makers.

•

BUFFALO—Plans to salvage approximately 10,000 tons of steel in the Honeymoon Bridge, which collapsed into the lower Niagara River Jan. 27, 1938, after being crushed by an ice jam in the gorge, are under consideration at Niagara Falls. At North Tonawanda, N. Y., pressure soon may be brought to force the International Railway Co. to sell about 5000 tons of steel in five long abandoned bridges there. Meanwhile, scrap is actually coming into dealers yards faster than they can prepare it. A surplus of cast iron has accumulated since the enforced cut in operations at foundries working on railroad carwheels and other railroad car parts.

TORONTO—Fresh offerings continue in heavy volume with supply now in excess of consumption. It is estimated between 300,000 and 500,000 tons of scrap are available in the Western provinces. Mills and electric furnaces are chiefly engaged in building stocks against future needs. Auto wreckers are rushing their scrap to market before the government steps in and takes over unsold stocks about the middle of the month.

•

MILWAUKEE—The BIC has made a proposal to the city to remove some 3000 tons of scrap steel in the form of buried street car tracks on abandoned routes without expense to the city. Under the terms of the proposal the WPA would assume the major item of $174,000 in labor expense and the city would realize about $58,000 for the scrap recovered which could be used for repaving sections dug up.

•

ST. LOUIS—The campaign to bring out scrap continues to get results, and the volume of receipts the first week in June was heavy. Steel mills have been enabled to build up some inventory, although not large, and the flow must be continuous to maintain the present high rate of output. Granite City Steel Co. took off one furnace but otherwise there was no change in ingot operations. Most railroad lists are being sold direct.

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SCRAP PRICES

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)		ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
		Machine Shop Turnings		Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

BUNDLES consisting exclusively of tin coated material and compressed into charging box size, are $4 per gross ton below No. 2 dealers' bundles. Bundles containing tin coated material but not composed exclusively of such material (outlawed by order M-24-b) are $8 below No. 2 dealers' bundles.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports $1; New England $1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where more than one grade of scrap is included in a shipment, the maximum price of all scrap in the vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use), add $5 to price of cast iron borings.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	18.00	19.00	20.50	21.00	21.25	21.50
Detroit	20.25	21.25	22.75	23.25	23.50	23.75
Duluth	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.	17.00	18.00	19.50	20.00	20.25	20.50
Seattle	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis	15.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 machinery cast, drop broken, 150 lbs.	$18.00	$19.00	$20.00
No. 1 cupola cast and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	June 9, 1942	June 2, 1942	May 12, 1942	June 10, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	June 9, 1942	June 2, 1942	May 12, 1942	June 10, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	53.00
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 142 to 150 herein.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
June 9, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1942	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71 May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢[14]	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massilon, Canton =2.70¢						2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.27¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem =2.10¢)				2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

Companions in PERFORMANCE!

"RS" Collapsing Tap — Five sizes — 1-1/4 to 2-13/16" with blade chasers. Larger sizes up to 5" with circular chasers. Shown equipped for stationary spindle.

Yes sir, *ANOTHER* Namco "Double Duty" Tool—

THE NEW "RS" COLLAPSING TAP

Remember — Namco "DR" and "DS" Circular Chaser Dies use interchangeable chasers and are also quickly adapted to hollow milling by substitution of cutters and holding blocks.

By similar economical planning — *One Basic Design* in the new "RS" Tap serves both revolving and stationary spindle machines. Quick and positive opening action, fine diametric adjustment and ground thread chasers offer the same precision and trouble-free production you are now getting from Namco Dies. Ask for proof of this outstanding performance.

"DS" Circular Chaser Die for stationary spindles. Sizes 3/8 to 4-7/8". Readily adaptable to Hollow Milling work.

"DR" Circular Cutter Hollow Milling head for revolving spindles. Sizes 5/16 to 4-7/8". May be quickly changed for threading.

THE NATIONAL ACME CO.

170 EAST 131ST STREET • CLEVELAND, OHIO

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • SOLENOIDS • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton $54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.53*	*$25.03*	*$26.53*	*$26.03*	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27 62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.38	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorus Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

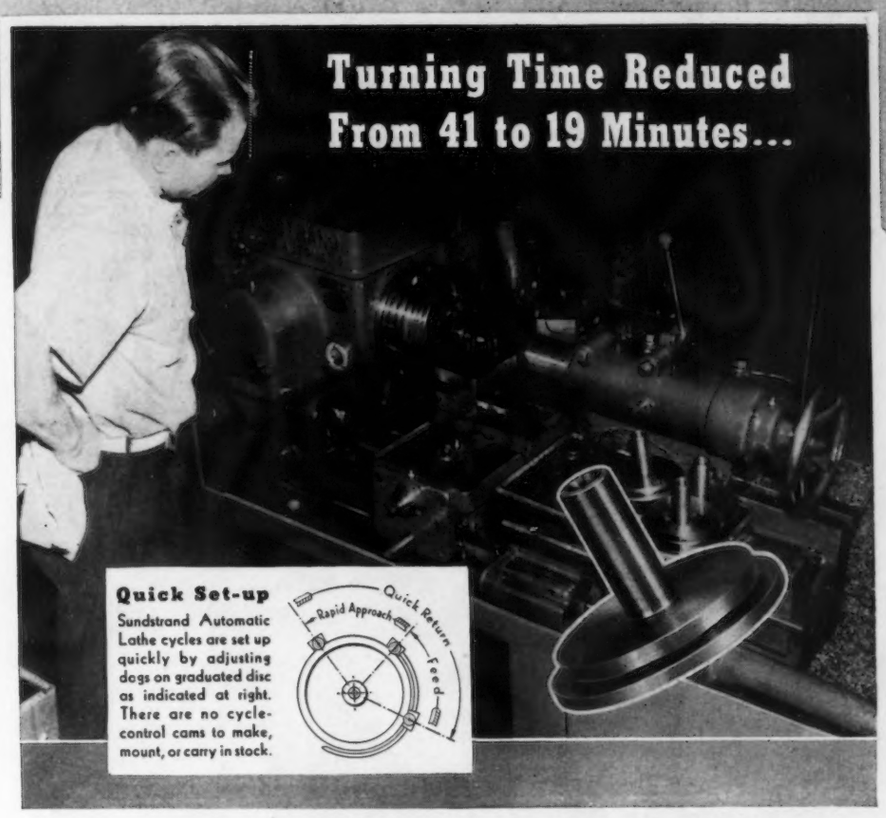
Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES *(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)*

CITIES	SHEETS		STRIP			Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	.....	$4.65	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05[5]	5.05	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.68*	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45[3]	.....	4.75[1]	3.70[3]	.....	3.55[3]	3.55[3]	3.50[3]	4.48	.....	.....	.....	.....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	4.90[5]	5.05	4.00	.....	3.70	3.70	3.85	4.04	.....	.....	.....	.....
Cincinnati	3.42	4.37[2]	4.42[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	.....	5.40	4.10	.....	4.05	4.05	4.00	4.15	.....	.....	.....	.....
Washington	3.60	.....	.....	4.10	.....	3.80	3.80	3.95	4.10	.....	.....	.....	.....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	5.32	5.52[1]	4.20	.....	4.15	4.15	4.10	4.42	.....	.....	.....	.....
Memphis	3.85	.....	5.25	4.10	.....	3.95	3.95	3.90	4.31	.....	.....	.....	.....
New Orleans	4.05	.....	.....	4.30	.....	3.90	3.90	4.10	4.60	.....	.....	.....	.....
Houston	4.00	.....	5.25	4.30	.....	4.05	4.05	3.75	.....	.....	.....	.....	.....
Los Angeles †	4.95	7.15	5.95	4.90	.....	4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco	4.55	6.40	6.10[7]	4.50	.....	4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle	4.65[7]	7.60	5.70[7]	4.25	.....	4.75	4.45	4.20	5.75	.....	8.00	.....	.....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia, galvanized sheets, one to nine bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. † Los Angeles prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

Engineered Production

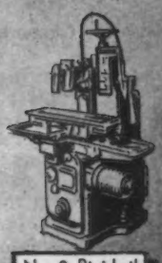


Turning Time Reduced From 41 to 19 Minutes...

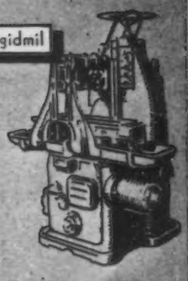
Quick Set-up

Sundstrand Automatic Lathe cycles are set up quickly by adjusting dogs on graduated disc as indicated at right. There are no cycle-control cams to make, mount, or carry in stock.

No. 00 Rigidmil



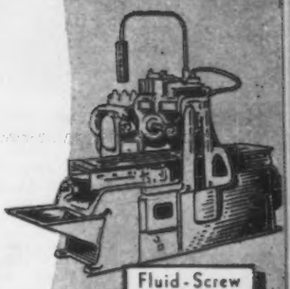
No. 0 Rigidmil



No. 1 Rigidmil

Get This Book ↓

Especially useful to men engaged in new work that involves turning, book A5-501 gives complete information about Sundstrand Automatic Lathes. Write for your copy, today.



Fluid-Screw Rigidmil

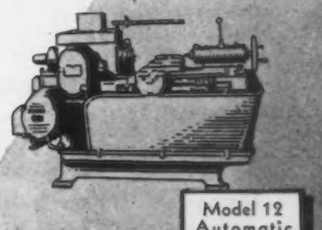
...At A Time When Even Seconds Count

In the Miscellaneous Shaft Department at a large airplane engine plant, Sundstrand Automatic Lathes are saving precious minutes on many turning operations . . . at a time when every *second* has extra value. They frequently double former production, always make operator's work easier.

For Example... Three operations on pump drive shaft shown above formerly required 41 minutes and operator's full time. On Sundstrand Automatic Lathe illustrated, same three operations now require only 19 minutes. Twenty-two minutes are saved, production is increased 116%, and operator can do other work while lathe runs through its automatic cycles. When photographed, shaft shown was being processed in lots of 200. Other shaft parts, in lots as small as 50 each, are turned on Sundstrand Automatic Lathes in this department with similar savings.

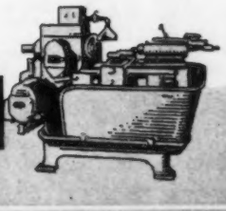
Here's Why... Sundstrand Automatic Lathes make big time-savings and production-increases because they have fast automatic cycles, multiple tooling, wide ranges of speeds and feeds. They are easily set up, can be changed from one average job to another in 20 to 25 minutes. See diagram above for one reason; see book shown at right for many others.

Investigate... See how Sundstrand Automatic Lathes can save time and increase production on your turning. Send us drawings with data and we'll give you Engineered Production proposals.

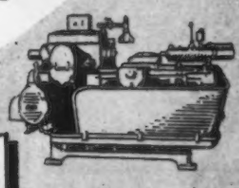


Model 12 Automatic Stub Lathe

Sundstrand Machine Tool Co.
2539 Eleventh Street, Rockford, Illinois, U. S. A.



Model 8 Automatic Stub Lathe



Model 10 Automatic Stub Lathe

In their respective fields, Sundstrand machine tools are unexcelled for high production, accuracy, and lasting value. Write for complete details.

RIGIDMILS · STUB LATHES

Hydraulic Operating Equipment — Drilling and Centering Machines

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 BW.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

FUEL OIL

No. 3 f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	4.285c.
No. 6 Bur. Stsd., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.

PERFORMANCE

that spells . . .

P-R-O-D-U-C-T-I-O-N

YOUR specific problem—*not all industry's*—gets solved when you rely on Birdsboro *Individualized* Roll Service. Find out *now* how to get extra roll life and more tonnage with Birdsboro Rolls.

Builders of

Rolls · Hydraulic Presses
Steel Mill Equipment
Crushing Machinery
Special Machinery

BIRDSBORO STEEL FOUNDRY AND MACHINE CO. • Plants at Birdsboro and Reading, Pa.

BIRDSBORO

ROLLS

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio.....$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb, Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.....$4.75
Old range, non-bessemer, 51.50. 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn.....68c. to 70c.
Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn.....81c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..$28.00
Rhodesian, 45 .....Nom.
Rhodesian, 48 .....Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt $6.00

Foundry

†Connellsville, prompt..$6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)....39.00

Base per lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts ..... 4.75c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount....63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

FLUORSPAR

Fire Clay Brick *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis....$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)..$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00